AV
COMMUNICATION REVIEW
FALL 1955

AUDIO VISUAL COMMUNICATION REVIEW

VOLUME III, NUMBER 4 FALL, 1955

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The Audio-Visual COMMUNICATION REVIEW is issued quarterly. Subscription $4.00 per year. Special rate to members of DAVI $3.00. Single copy $1.25. Entered as second class mail matter in Washington, D. C., and additional entry at Rochester, New Hampshire.

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AUDIO-VISUAL COMMUNICATION—AN EDITORIAL

The potential media of communication have multipled in the last half century. All of them come into an arena dominated for centuries by the verbal communication media. All of them, to a very large extent, are dominated by individuals versed and trained primarily in the verbal media.

As the first locomotives were called iron horses and the first automobiles were called the horseless carriages, we must recognize that most of the modern media are still being produced in the image of more ancient media. Our educational television programs drag behind them the tradition of radio, our educational films are still largely pictured textbooks, and our books seldom recognize the existence of other media.

The personnel of the field reflect these traditions. Few if any individuals are trained in the quiet and balanced examination of all media to ascertain what messages, what objectives, what audience each particular media can serve most effectively and most efficiently.

The availability of materials of instruction is a large factor in the determination of functional curricula. The differences between materials intended to be used by a group and those intended for use by individuals are very real and of far-reaching significance. The differences between materials based on conceptual media and those based on perceptual media are sharp and should be of immediate concern to all individuals concerned with instruction and information.

It is well to remember that every media exists because it says something that could not be said at all, or else could not be said so well through any other media. John Dewey has pointed out that: "The needs of daily life have given superior, practical importance to one mode of communication, that of speech. This fact has unfortunately given rise to a popular impression that the meanings expressed in architecture, sculpture, painting, and music can be translated into words with little if any loss."

We still do not know or understand the role of pictorial symbols in the development of attitudes; nor the role of the perceptual media in the manipulation of experience; nor why it is that some forms of motion pictures develop one kind of discussion, while other forms develop others. We know a good deal of the end results, but our understanding of the "why" of these results must await a far greater body of research than is now available.

Until our research is carried much further, we must depend on our own observation and experience. There is no real competition between the media. It is not an "either-or" proposition but rather one of "which and in what combination with others." The salvation of communication, is not going to lie in any one media, but rather in the balanced and effective use of all.

Few if any people are trained in this at the present. In spite of our own narrow experiences, each needs to see as objectively as he can the total problem in terms of all the media. Thus, there may come a clearer recognition of the problems involved and sharper and more fundamental research. Thus, also, will come the increase of efficiency in communication. An increase of a single iota may make a difference in the Wellsian race between education and catastrophe.

Floyde E. Brooker
Acting Executive Secretary, DAVI

A LOOK AT THE FUTURE OF A V COMMUNICATION

• JAMES D. FINN

This imaginative look at the future of AV communication is based on an address given by the author before the national convention of the DAVI in Los Angeles on April 19, 1955 entitled "Will ESP Replace AV?" James D. Finn is associate professor of education at the University of Southern California.

MY TEXT comes from a rather famous speech by President Griswold of Yale University on occasion of the National Book Awards dinner in 1952. Dr. Griswold, an exceptionally literary man, for a college president, was discussing his favorite topic—the decline of reading and thinking in the United States. As he neared the climax of his speech, he shook the walls of the Waldorf Astoria and later the pages of the *Saturday Review* and *Harpers* with these machine-gun like statements: "What are we doing under our forests of television masts . . . ? We are succumbing one by one to technological illiteracy. We have traded in the mind's eye for the eye's mind. . . . Here and there . . . reading still hangs on in competition with more efficient methods and processes, such as the extra-sensory and the audio-visual." (3:71)

Now, although I am a great reader of science fiction, I was not aware that *extra-sensory perception*—thought transference to those of you who slept through general psychology—had reached the stage where it had become as efficient as we all know audio-visual communication to be. When I was asked to examine the future of the audio-visual communication movement, it occurred to me that an exploration of President Griswold's thesis might be a good starting point. If thought transference is possible in the near future, we might as well disband now, go home, and buy a pack of the famous Rhine cards.

Actually, of course, Dr. Griswold was speaking ironically. He was, however, speaking in a great tradition of both older and contemporary literary figures, including William Wordsworth, Henry James, Clifton Fadiman, and Joseph Wood Krutch, all of whom have attacked, in poem and essay, the more efficient means of communication, be they illustrated books and newspapers as in the case of Wordsworth, or all audio-visual materials and devices as in the case of Krutch. Implicit in these criticisms of "efficient" communication as compared to reading, there lies a theory of history. And without a theory of history, it is not possible to assess the future.

Presumably, Dr. Griswold, Mr. Fadiman, and Joseph Wood Krutch make use of running water, automobiles, and can openers and, presumably, Wordsworth was willing to settle for the usefulness of Watt's steam engine. It would seem, then, that this branch of the intellectual community decries certain kinds of material progress but not others. As the historian, Herbert Muller, has pointed out, Thoreau took civilized tools and materials with him into the woods when he wanted to survive *without* civilization; and, in another place Muller points this position up when he says, ". . . we have the curious spectacle of civilized man forever marching with his face turned backward—as no doubt the cave men looked back to the good old days when men were free to roam instead of being stuck in a damn hole in the ground." (6:69)

All forms of material progress, including the development of audio-visual techniques and devices for communication, admittedly have brought evil. Material progress and specialization—which is one definition of civilization—have also brought good. A theory of history which can encompass this contradiction in order to help us assess the future, even for the audio-visual field (which is almost a symbol of technical progress), is all-important. We cannot accept Griswold with his "hole in the ground" approach; we cannot accept his ironical suggestion that, in the immediate future, technology will be replaced by mental energy. What, then, can we say of our increasingly technical and specialized development in communication that will give us guideposts for the future?

Again, Muller seems to me to be pertinent. His position is that: ". . . in the long evolutionary view, reaching back to the cave man and ape man, there unquestionably has been progress—always granted the assumption that it is worth being a human being. Man has achieved greater mastery of his natural environment, greater freedom of action, and thereupon has discovered the finer

possibilities of life implicit in his distinctive power of consciousness." (6:72)

Progress, according to this view, is not inevitable. As man is increasingly freed by technology and civilization, he achieves a greater power to make choices which control his own destiny. These choices can be wise or foolish, but it is technology and civilization that give him the opportunity to make them. This view explains why man has, at times in his development, moved in the wrong direction. Today, we have more choices than ever before; we will probably make more mistakes. But, with Muller, I think that, "Our business as rational beings is not to argue for what is going to be, but to strive for what ought to be, in the consciousness that it will never be all we would like it to be." (6:74)

As Whitehead said, "It is the business of the future to be dangerous." Into this uncertainty, into this plural universe where we can make mistakes and intelligent choices, let us project the technological field of audio-visual communication and apply this theory to three great problems facing our society: (a) the problem of knowledge, (b) the problem of the second industrial revolution, and (c) the problem of the public philosophy.

THE PROBLEM OF KNOWLEDGE

Many dimensions of the problem of knowledge will plague us with communication problems in the future. One of the most difficult aspects of this problem is the fantastic and incredible *increase* in human knowledge. As the sociologists have told us, we have, indeed, invented a method of invention and this method of invention continually spews forth knowledge and information day and night with a double shift working on week ends. For example, the *Quarterly Journal of Current Acquisitions* of the Library of Congress reported for August 1954, that the library had received in the fields of science, technology, medicine, and agriculture alone approximately 30,000 journals, including 2000 new titles; 25,000 research reports; 15,000 books and monographs; 15,000 manuscripts; 10,000 pamphlets; 5000 prints, blueprints, microfilms, and the like, and 150,000 maps and charts. (1)

Because President Griswold desires that we should read all the books in print in the Western World, I took pains to inquire as to the holdings of the Library of Yale University at this time. According to a story in the *Los Angeles Times* (5), the Yale University Library now contains 4,245,583 volumes; it occupies second

place of all university libraries in the United States (Harvard is number one, with almost 6,000,000 volumes).

The nature of the problem then becomes clear. It would take one person, reading 24 hours a day, approximately a thousand years to get through the present Yale Library. In the meantime, at the present rate of increase of knowledge and information, at the end of that 1000 years he would have not made a dent in the then-existing collection. In fact, at the present rate of increase, figuring two hours per book, it would take one person, reading 24 hours a day, approximately two years to read the 15,000 volumes received in the sciences and technology by the Library of Congress during a three-month period. Reading eight hours a day, it would take him approximately six years and that includes Sundays and holidays.

This log jam has to be broken if this knowledge is to be communicated and made useful. It obviously cannot be done by increasing reading speed, desirable as that may be. The World War II Navy slogan for audio-visual materials, "More Learning in Less Time," is one possible approach to this problem. Audio-visual specialists looking toward the future must realize that the next great development of the audio-visual field must be an organized and systematic attack on existing and nascent knowledge so that it may be communicated. This implies an expansion of materials, equipment, and personnel that even the dreams of the audio-visual prophets that were so current right after World War II did not anticipate. This is a great social need; our society must meet it beginning now and projecting forever into the future. Money, vision, and ingenuity must be continually applied to the communication of knowledge.

The skyrocket growth of the record of knowledge is not, however, confined to books. Each year our films, filmstrips, recordings, charts, and kinescopes increase. We are already beginning to meet, on a smaller scale, the problems faced by book libraries on an extensive scale. That problem, stated generally, is, when such an extensive record of knowledge exists, how we can locate within this record an item of information we desire. If the existing collection of audio-visual materials is to serve us—if we are to get the right material to the right place at the right time, as so many of us try to do—we must begin now to do something about classification, cataloging, and location.

The existing film catalogs of libraries, the existing methods used by producers to supply information on new materials, the existing general lists of films, filmstrips, and records, the existing

methods used by libraries to book and distribute materials belong, for the most part, as much in the middle of the twentieth century as does the dugout canoe. There are today at least fifty companies that manufacture and install all sorts of ingenious data-handling equipment, used by banks, insurance companies and scientific institutions. Items can be scanned at the rate of a thousand a second, digital computors can manipulate records, and photographic techniques may be applied to records in all sorts of ways. With the exception of a few IBM machines scattered here and there in some of the larger audio-visual departments, nothing has been done in the field of classification, cataloging and location of audio-visual materials that is worthy of this century. We are still publishing catalogs outmoded before they are printed, which grow thicker every year until eventually the post office will have special ten-ton trucks just for the delivery of audio-visual catalogs from which you will have to order ten years in advance.

The techniques of the twentieth century are now available to help us organize that part of knowledge and information that exists in the record of audio-visual materials. Where, then, are those who are working to code audio-visual materials so that they may be handled under some data-processing system? The government—and, as Vannevar Bush has pointed out, such general coding is a legitimate task of government—cannot even modernize its postal system where modern data-handling methods could be applied immediately. The audio-visual industry, some of whose systems are roughly comparable to building a house in 1955 out of hand-hewn logs and tarpaper, seems no better able to assist.

And the profession? The profession is always fifty years too late, although a case can be made that the nature of the educational enterprise in this country makes this inevitable. Again, looking to the future, we should set up projects, beginning tomorrow morning, designed to plan, code, and introduce modern data-handling procedures into the audio-visual materials system. There is no technical reason, for example, why every teacher in the nation couldn't have almost instantaneous information on any given *scene* in a film, let alone the film.

We are also faced with the fact that knowledge, as it becomes more specialized, undergoes continual splintering—a fact which continually worries people concerned with general education. This splintering of knowledge into smaller and smaller compartments has reached the point where information and ideas are no longer

being communicated generally among men of learning, not to mention the general public. The ear surgeon cannot speak to the nose surgeon and be understood; the sales tax lawyer can say no more than hello and goodbye to the income tax lawyer; the curriculum director and guidance director cannot even worship Rousseau at the same altar.

This situation, the creation of specialized ignoramuses, so prevalent in America today, is the legitimate concern of President Griswold and many others; for example, his somewhat older compatriot, Robert Maynard Hutchins. Somewhere Mr. Hutchins has said that it would not be necessary to burn the books, only to leave them unread for a couple of generations.

Now the concern here is for ideas—great ideas. While I do not agree at all with Mr. Hutchins' basic philosophy, I certainly agree that a highly specialized illiterate is a danger to society. However, Mr. Hutchins and Mr. Griswold, it seems to me, are going at it "wrong end to." In order to be civilized, we must be specialized. At the same time, we need great generalizing ideas which can cement the fields of knowledge together and infuse them with value. And at the more practical level we need to communicate specialized findings between related specialists.

Although it is not often realized, this problem of communicating knowledge between specialists has held back science and thought even in times when the accumulation of knowledge was relatively small. Two predecessors of Charles Darwin, one William Charles Wells in 1813, and one Patrick Mathews in 1831, described evolution by the means of natural selection which Darwin, in ignorance, redescribed in 1859. Wells' paper was written when Darwin was four years old, and never communicated. Think what the situation must now be with our mountains of undigested, unlocated knowledge—knowledge held incommunicado—without communication.

It seems here that the audio-visual field of the future must play a crucial role. We cannot stop specialization for we will stop civilization, whether Mr. Hutchins thinks civilization lies in the great books or not. We must devote much of our future production to the preparation of materials which can generalize knowledge and convey great ideas efficiently, and we must devote other production to speeding up and making more efficient communication between groups of specialists. Generalizing ideas, value concepts will not necessarily die if we cannot read all the books. Audio-visual materials must be

reoriented in part from the *Adventures of Bunny Rabbit* to such difficult generalizations as, for example, the role of science in society.

Several problems revolving around the concept of the precision of information are also pertinent to our general problem of audio-visual materials and knowledge. Two of these may be described as (a) simplification and (b) information which cannot be coded either into language or pictorial means.

As knowledge increases and becomes more specialized, it also becomes more complex. At one time, for example, in the nineteenth century, Lombroso developed a system of criminology which classified all criminals by facial types and ascribed a biological basis for crime. Today, the causes of crime and the nature of the criminal are known to be extremely complex and possible only of simplification in the tabloid newspapers.

It is in the nature of audio-visual materials to over-simplify many complex ideas and chains of ideas. This is a very great danger as knowledge becomes more and more complex. A motion picture is a highly selective device that permits little qualification in its grammar. The users of audio-visual materials in the future will have to have more subject-matter knowledge, not less, in order to handle this difficult problem in the communication situation, or we will, indeed, produce a generation with little learning. Producers must face up to the same problem. And the consumer of audio-visual materials must learn to apply the techniques of critical thinking to this type of communication.

You are all familiar with Edgar Dale's "Cone of Experience" or some other concept of the ladder of abstraction of knowledge. All of these ladders put words or language at the top as the most abstract means of communication or formulation of knowledge. We have always assumed, in dealing with audio-visual materials, that, by using these various representations of experience—the film, filmstrip, recording, and the like—that we can help individuals better comprehend what they read by building meaning into abstractions (words).

This idea that words are the most abstract containers of knowledge is now a more or less false idea. Above words, exists a higher order of abstraction that comes more and more into use as this century progresses. I refer to mathematics. There are now many concepts impossible to describe except mathematically. Language will not do. One of the basic ideas of quantum physics—that light

behaves both in terms of wave motion and in terms of bundles, quanta or corpuscles—cannot be adequately described in words. In fact, in much of modern physics, and, increasingly in other fields, mathematical formulations are the only means by which the knowledge can be handled. Information theory itself consists of the equations of thermodynamics as developed by Shannon. I recently read a paper describing the mathematical theories of history by a professor of mathematics at the University of Chicago.

Precisely what this development means, I am not, at this time, prepared to say. Certainly, it should make us more humble toward the possibility of communicating all of knowledge by audio-visual means in the future. While, for example, the concepts of entropy may be visualized, they may not be visualized in the mathematical sense and they cannot be stated in language And here I am certain that even Dr. Griswold's ESP will not help us much. The problem of the formulation and communication of knowledge is vast; we must be prepared, in the future, to question a number of assumptions regarding audio-visual materials that are accepted without question today; basic here is the concrete-abstract relationship.

There is also a possibility inherent in the great ability of audio-visual materials to simplify and to communicate efficiently that can make the future of knowledge dark instead of bright, terrifying instead of hopeful. I refer here to the fact that audio-visual communication techniques can be used in the future to pervert knowledge and information to immoral ends. This is the last dimension of the problem of knowledge that I wish to consider.

In science fiction, as has been demonstrated over its long history, we can find great artistic insights into the possibilities of the future. Throughout modern, Utopian science fiction, as handled by the greatest writers, runs a common, horrifying thread. This thread can be found in Huxley's *Brave New World*, in Orwell's *1984*, in Ray Bradbury's *Fahrenheit 451*, and even in such a short story as Henry Kuttner's incredible *Year Day*. This thread is also present in the writings of philosophers. Bertrand Russell considers the possibilities of the scientific totalitarianism of the future which may come into existence if we make the wrong choices.

The common thread of horror as seen by these insightful artists is that the mass communication media—audio-visual media for the most part—may in the future be the means by which society is conditioned both in school and out for life in a totalitarian regime. Audio-visual materials are the ideal means for this. With them, we can truly convince that black is white, that Big Brother is all good,

that humanity is worthless. With these materials, we can make all of society into one vast Pavlov's dog, conditioned to accept whatever it sees and hears as true knowledge, and to salivate at the will of its director. It is entirely possible, with the right controls, to pervert knowledge and control information with audio-visual materials.

This, you may say, is not the concern of audio-visual people. You may say that our job is to take the materials as developed and see that they are used. This point of view I would call the transmission-belt concept of the audio-visual mission, and I will not accept it. If the job of audio-visual people is merely to transmit materials, if we turn our minds and energies to it, we can all be replaced by electronic computers in ten years—computers that can do our jobs much more efficiently. (We might then reconvert to ESP specialists.)

I submit that it is our job to be concerned about the content and philosophy of the materials we use in the future. I agree with the anthropologist, Redfield, who, in recently discussing the scientific method with his colleagues, said, "Just who are you neutral for?" and he answered this question, "I have placed myself squarely on the side of mankind and I wish him well." (7:141, 145)

Already there are signs that pressure groups, government officials at various levels, and various people with axes to grind, desire to step in and control the audio-visual materials we use in the schools. The films of my good friend, Lester Beck, cannot be used in a school system not far from here, due to the efforts of an interesting combination of pressure groups. In the same system, great pressure is put on the audio-visual department to list the programs of a reactionary radio commentator in a radio listening bulletin for schools and to eliminate naming any liberal commentators whatsoever. This is the beginning of 1984 in 1955. In the public arena, we have in existence phony television forum programs and allegedly impartial magazines, which are elevating the perversion of information into a fine art.

If we are on the side of mankind; if we believe that the future must contain choices, we must, in the future, defend the freedom of audio-visual communication and see that the materials contain, insofar as it is possible, all knowledge, not a perversion of it.

As I have tried to show, then, the problem of knowledge, in terms of its scope, in terms of its organization, location, and distribution, in terms of its increasing specialization, in terms of conveying it precisely, and in terms of its possible perversion are all

intimately connected with the future of audio-visual communication. The problem of knowledge is one of the greatest our society must carry into the future; it is an absolute social necessity that we begin now to apply audio-visual techniques to aid in its solution, and to protect its integrity.

THE PROBLEM OF THE SECOND INDUSTRIAL REVOLUTION

Knowledge and technological civilization are two sides of the same coin. Technological civilization has been the product of the Industrial Revolution. Today we are told that we are in the beginning stages of the Second Industrial Revolution. Two factors are making this possible—atomic energy and automation.

Atomic energy, in its peace-time aspects, will help us do better the world's work. Automation, while ostensibly also helping us with the world's work, will apparently redesign the world in which we live. Automation is simply defined as the use of machines to run machines. Electronic computers and other forms of control mechanisms now make it possible to move materials to a machine, control the machine while it is in operation, change the setting of the machine, and keep track of its production. Feedback of information at all points keeps the system running.

Mr. Walter Reuther first called the attention of the nation to automation and to the specter of unemployment *and* promise it presents. Since then, we have heard much concerning it. A complete automobile engine can now be made, it is said, untouched by human hands in a sort of push-button factory controlled by electronic brains. Application of the process is seen in oil refineries, pipe-lines, and even in forestry.

However, as Peter Drucker has recently pointed out, automation is not a man-less, machine-operated production. Its primary characteristic is a process—a way of thinking involving patterns and self-regulation. It is here that the educational implications are tremendous. Automation is not simply a problem of technological unemployment or employment. To quote Drucker, "Automation's most important impact will not be on employment, but on the qualifications and functions of employees." (2:44)

This means that very large numbers of workers of high technical skill will be needed to create, maintain, and control the machines. More important, large numbers of managers will be required to operate the process—to think, to analyze, to decide. Some economists feel that another complete upgrading of all workers is absolutely necessary to run an automatized world. The

peasant, with his wooden hoe, was once upgraded into a semi-skilled factory worker over a long, long period of time. The factories and offices of tomorrow will need higher grade employees to be created immediately—employees working under a system which makes possible the human use of human beings.

In order to avoid technological unemployment, it is the best estimate of many familiar with the situation that much of our labor force will have to be retrained quickly for new jobs; that much of the future labor force will have to be provided with the kind of generalized education required to produce men capable of high level analysis and synthesis; that the increased use of leisure time—the 30 hour week is not far off—will demand a change in all education.

Audio-visual materials may be the only answer to the restraining problem—audio-visual materials created and used jointly by the schools, industry, and labor unions. The estimates of the number needing such training run into the millions. The speed needed approaches that of World War II. If this hypothesis is true, the future demands on the audio-visual field will be fantastic.

The type and use of audio-visual materials in the schools of the future to educate young people to live and participate productively in the society created by the Second Industrial Revolution will have to be much different. The curricular implications are clear. Life Adjustment, a curriculum movement which is already being questioned in some quarters, in my opinion, will be dead as the dinosaur.

The creeping control of the emotional "Rousseauians" over all levels of education will be halted and restored to its proper perspective. We are on the edge of an era requiring an iron content in our education—whether the curriculum supervisors and some of their audio-visual worshippers are ready for it or not. This content will, by no means, be the same as the much maligned subject matter of yesteryear, and so will give scant comfort to Professor Bestor and other critics, but it is also certain that it will not consist of courses in how to paint your house. New audio-visual materials must be created and used to carry this content. It was not easy to move the peasant with his hoe to the level of a machine tender; it will be more difficult to make the next move, upgrading the entire intelligence and achievement of the American people. We will have to do it, and audio-visual materials are our best bet to help us.

THE PROBLEM OF THE PUBLIC PHILOSOPHY

Finally, I should like to say a word about the communication of the public philosophy. Walter Lippman has recently produced what is probably his greatest work, *The Public Philosophy* (4). In this book, Lippman traces the causes of the decline of the western democracies to the disintegration of the public philosophy—our general traditions of government and civility. One reason for this decline, he suggests, is due to the fact that we have not remade this public philosophy—the glue that holds us all together—to fit the times; another reason is that, through a mistaken theory of education and a general surrender of the communication media to trivia, we have not communicated the public philosophy. His remedies lie in the reverse of this process—the remaking of our traditions of civility to fit the times and the rebuilding of an educational and communication system that will communicate them.

Mr. Lippman's position in the *Public Philosophy* has been soundly criticized. I am inclined to agree with some of these criticisms, particularly those that point out that his analysis is principally based on European experience. At times, one wonders whether or not Mr. Lippman really knows the United States at all. However, his thesis that a public philosophy adequate for the times needs to be communicated throughout our society is very sound.

This, it seems to me, is the final and great challenge for the audio-visual movement in the future. We can well disintegrate without blowing ourselves up in an atomic flash. We can become so immersed in trivia that a scientific dictatorship is inevitable. With an adequate and adequately communicated public philosophy made possible, in part, by the intelligent use of the audio-visual media of communication, we can survive to look forward to a freer and happier life.

This has been my theory of history as it frames the future of audio-visual communication. The future presents us with the picture of an incredible load of knowledge, a radically new social organization, and a necessity to communicate the public philosophy. ESP will not handle these problems at all; Dr. Griswold's books can make some contribution; audio-visual communication, I am convinced, must carry the major share of the load into the future—the future which will always contain the contradictory elements of good and evil—between which we must always make difficult and constantly more intelligent choices.

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LEARNING SETS: KINESCOPE VS FILM

• PAUL M. HURST, JR.

The reluctance of audio-visual communication researchers to replicate previous experiments has doubtless resulted in the acceptance of many invalid conclusions. Missing from social science research is that drive which is one of the characteristics of research in the physical sciences: to either verify or refute previous findings by repeating the experiment. In this study such a replication has been made of an earlier experiment—and with different results. Paul M. Hurst, Jr. is an instructor of psychology at Idaho State College. This report is based on a thesis submitted in partial fulfilment of requirements for the Master of Science degree at Pennsylvania State University.

THE PURPOSES of this study were: (a) to ascertain whether trainees will learn more or less from a training film if they are told that it is a "kinescope recording of a television program," rather than a "training film," and (b) to see if trainees will learn more or less from a kinescope recording if it is introduced to them as being a "training film" rather than a "kinescope recording."

This research was an extension of a study conducted by Robert Jackson of the Special Devices Center.[1] In his experiment a training film (*Pattern for Survival*) was shown to groups of trainees under two conditions: (a) to the first group the film was described as a kinescope recording of a television program, (b) to the second group the film was introduced as a regular training film. Similarly a kinescope recording of a television program (*Radiological Defense*) was shown to two groups of trainees. Jackson told one group that this kinescope recording was, in fact, a kinescope; the other group was told that it was a regular training film. A further section of Jackson's experiment dealt with color as an experimental variable, but the results were nonsignificant and do not concern us here. The results of the main part of the study, however, were highly significant.

[1] Jackson, Robert. "Learning from Kinescopes and Films." *Technical Report SDC 20 TV 1.*

Jackson found that the group seeing the training film (*Pattern for Survival*) introduced as a "kinescope" obtained a mean learning gain of 40, whereas the group seeing this same film introduced as a "training film" earned a mean gain of 26. The group seeing the kinescope (*Radiological Defense*) described as a "kinescope" obtained a mean learning gain of 36, whereas the group seeing this same kinescope described as a "training film" obtained a mean learning gain of only 28. Both differences favor the situation where the material presented was described as a "kinescope recording of a TV program" at the 1 percent level of confidence.

These differences were so striking that it was considered advisable, in the present experiment, to repeat the above study using the same kinescope and film with different subjects, and to attempt to generalize Jackson's findings by testing learning from two additional kinescope recordings and two additional training films.

EXPERIMENTAL PROCEDURE

Subjects

The subjects taking part in the present experiment were recruits at the Bainbridge Naval Training Center. A total of 931 men took part in the experiment. Each film-kinescope comparison pair of groups was initially matched on the basis of number of weeks of training and mean Navy General Classification Test scores.

Films and Kinescope Recordings Used

The several groups of subjects saw the following kinescope recordings or training films:

Kinescope Recordings	Training Films
A. Radiological Defense	D. Pattern for Survival
B. Manila and Wire Rope	E. An Introduction to Measuring Instruments
C. Survival at Sea	F. Castaway, Part I

Reasons for Selection of These Kinescopes and Films

A and D were the kinescope and film used by Jackson.

Failure to generalize Jackson's finding to other training films and kinescope recordings (assuming they were confirmed for *Radiological Defense* and *Pattern for Survival*) could be due to several causes among which are the susceptibility of training films to representation as kinescope recordings and vice versa. Also, differences in the motivational influence of particular films or kinescopes could interact to a varying degree with differences in "set" induced by describing the material presented as "a kinescope recording" or as "a training film."

Therefore, it seemed desirable to select films or kinescopes which differed widely in a number of characteristics: (a) Interest value, (b) dramatic qualities, (c) idea burden, and (d) susceptibility to representation as a training film or kinescope recording.

It is considered that the above films and kinescope recordings show an adequate dispersion of these qualities. For example, trainees might readily accept the film, *An Introduction to Measuring Instruments,* as a kinescope recording of a TV program as it was filmed in a studio and consisted mainly of close-up views of measuring tools. On the other hand, it was considered that the film, *Castaway,* might not be so readily accepted as a kinescope recording of a television program as it consisted chiefly of scenes of an aviator at sea in a small life raft. Similarly, the kinescope, *Survival at Sea,* might be quite readily accepted as a training film because it contained a number of televised film sequences, whereas *Manila and Wire Rope* might be less well accepted by the trainees as a regular instructional film, since its treatment followed more along the line that might be expected in a television presentation of this subject. *Castaway* was an interesting story-type dramatic film while *An Introduction to Measuring Instruments* was an expository film with a rather high idea burden. *Radiological Defense* and *Pattern for Survival* dealt with atomic defense, a subject matter which was assumed to be of general interest.

Since every comparison was based on each film (or kinescope) described as (a) a "kinescope," and as (b) a "training film," it was considered unnecessary for the subject matter of the films selected to parallel that of the kinescopes. However, A-D and C-F are somewhat parallel in subject matter, while B-E are not.

Tests

The tests used in the experiment were of two types.

1. True-false tests. These were Jackson's original tests (of 100 items each) given to the groups that saw *Radiological Defense* and *Pattern for survival.*

2. Multiple-choice tests. Multiple-choice tests, each comprising between 50 and 60 items, were constructed by the Instructional Film Research Program staff members to cover the content of the other films and kinescope recordings. (Table 1 shows the reliabilities of these tests.)

In addition, Navy GCT and Mechanical Aptitude test scores were available for every trainee.

TABLE 1 — ESTIMATED RELIABILITY OF TESTS

Test on:	*No. of Items*	*Type*	*Reliability*[1]
Radiological Defense	100	True-false	.69
Manila and Wire Rope	55	4-choice	.86
Survival at Sea	54	4-choice	.84
Pattern for Survival	100	True-false	.70
Measuring Instruments	60	4-choice	.99
Castaway	61	4-choice	.79

Procedure

Main Experiment. Twelve groups of trainees—six pairs of groups matched as closely as possible—were used in the main experiment. Table 2 shows the experimental groups and treatments.

TABLE 2 — EXPERIMENTAL GROUPS AND TREATMENTS (MAIN EXPERIMENT)

Group	*N*	*Film or Kinescope Presented*	*Material Introduced As:*	*GCT*	*MA*
1	56	Radiological Defense	Kinescope	51.70	48.89
2	65	(Kinescope)	Training Film	50.60	49.89
3	40	Manila and Wire Rope	Kinescope	51.35	50.35
4	36	(Kinescope)	Training Film	50.30	46.08
5	46	Survival at Sea	Kinescope	49.43	48.15
6	43	(Kinescope)	Training Film	49.88	48.16
7	64	Pattern for Survival	Kinescope	49.12	47.12
8	66	(Film)	Training Film	48.57	47.81
9	72	Introduction to Measuring Instruments	Kinescope	51.87	51.62
10	67	(Film)	Training Film	50.45	50.07
11	65	Castaway	Kinescope	53.88	51.15
12	58	(Film)	Training Film	51.34	50.15

Each group first heard the instructions and was then pretested on the material to be presented. Each group next saw either a kinescope recording or training film, and was then post-tested using the same test.

The introductory remarks were similar to those used by Jackson. All subjects were told in advance that they would be post-tested on the test they were about to take as a pretest. Time of day for testing was staggered to avoid systematic bias to either method of presentation throughout the series of comparisons made.

Scores on the pretests and post-tests were obtained. In addition GCT and MA test scores were available for each trainee. Analysis of covariance was employed to determine the significance of differences between the two conditions of presentation for each of the six pairs of groups. The covariance was used to correct for small differences between groups in GCT and MA scores, and

[1] These reliability coefficients were computed using the Kuder-Richardson Formula 21.

scores on the pretest on the subject matter. Scores on the post-test were used as the criterion of learning. It was assumed that the groups were homogeneous, and no tests for homogeneity of variances and regression were made.

Replication. Anomalous results obtained for the film, *An Introduction to Measuring Instruments,* (see "Results" below) prompted a replication of the experiment with this film. During this replication an electrical power failure caused the "loss" of the "training film" group. Consequently, another replication was performed, this time embodying both *An Introduction to Measuring Instruments* and *Radiological Defense.* Characteristics of the groups used in the replication are given in Table 3.

TABLE 3 — EXPERIMENTAL GROUPS AND TREATMENTS (REPLICATION)

Group	*N*	*Film or Kinescope Presented*	*Material Introduced As:*	*GCT*	*MA*
1	70	Radiological Defense	Kinescope	51.19	49.20
2	59	(Kinescope)	Training Film	53.81	52.41
3	61	Introduction to Measuring Instruments	Kinescope	51.10	49.93
4	63	(Film)	Training Film	51.41	50.92

RESULTS

Main Experiment. Results of the main experiment are presented in Table 4. Of the six comparisons made in the original experiment, none showed a statistically significant difference in learning between groups for the two methods of introduction. Five of the differences were very small. However, for the film, *An Introduction to Measuring Instruments,* a difference in mean post-test scores of 38.8 to 31.3 was obtained, the difference being in favor of the "kinescope" group. Although this difference was not statistically significant, it was felt that it would be unwise to ignore a difference in learning of 7.5 points on the grounds that it "may have been due to chance." Consequently, the above mentioned replication was performed. *Radiological Defense* was also replicated because our findings on this film were so much at variance with those of Jackson.

Replication. The results of the replication of *An Introduction to Measuring Instruments* and *Radiological Defense* are given in Table 5.

The replication confirmed the smallness and statistical insignificance of the difference between the two methods of introducing the kinescope recording *Radiological Defense.* For the training film, *An Introduction to Measuring Instruments,* a difference of three points was obtained, this time in favor of the "training film"

group, and this difference was significant at the 5 percent level of confidence. It will be noted that this difference was in the opposite direction to the difference obtained in the main study which favored the kinescope group. The difference in that instance was 7.5 points — a difference which did not reach acceptable levels of statistical significance. This seemingly inconsistent result could arise from the fact that the method of analysis of covariance maximized the effect of sampling fluctuations in the correlation coefficients of the matching variables with the criterion.

Thus, out of eight comparisons, the reversal observed for two comparisons on the same film might be expected on the basis of sampling differences. Or, in this particular instance, it could be the result of the lack of relevance of this one film, *Introduction to Measuring Instruments*, to the training of Naval recruits, with a consequent lack of motivation to learn from it. This would make their performance more sensitive to fluctuations in their daily training routine which could differentially affect a pair of comparison groups. The great variability of scores obtained in both testings of this film (see Tables 4 and 5) could be caused by variability in motivation.

TABLE 4 — PRE-AND POST-TEST MEAN SCORES AND STANDARD DEVIATIONS FOR GROUPS SEEING KINESCOPE RECORDINGS (MAIN EXPERIMENT)[1]

Introduced as:	N	Pretest mean	S. D.	Post-test mean	S. D.
A. *Radiological Defense*					
Kinescope	56	50.12	6.48	64.37	7.60
Training Film	65	49.97	6.82	64.85	8.82
B. *Manila and Wire Rope*					
Kinescope	40	17.87	4.56	33.07	9.92
Training Film	36	20.64	5.60	34.19	8.33
C. *Survival at Sea*					
Kinescope	46	16.76	4.10	36.91	9.20
Training Film	43	18.98	5.48	37.67	8.07
D. *Pattern for Survival*					
Kinescope	64	55.87	7.18	69.25	9.71
Training Film	66	56.15	6.22	69.32	8.34
E. *An Introduction to Measuring Instruments*					
Kinescope	72	19.76	9.87	38.76	15.30
Training Film	67	15.57	7.80	31.28	16.52
F. *Castaway, Part I*					
Kinescope	65	21.62	4.98	51.69	7.70
Training Film	58	20.45	4.92	52.31	8.55

[1] These are uncorrected means. In view of the small differences between groups on the matching tests, the corrected means would be substantially similar.

TABLE 5 — PRE-AND POST-TEST MEAN SCORES AND STANDARD DEVIATIONS (REPLICATION)[1]

Introduced as:	N	Pretest mean	S. D.	Post-test mean	S. D.
A. *Radiological Defense* (Kinescope recording)					
Kinescope	70	49.36	4.80	63.96	6.39
Training Film	59	53.85	6.60	65.34	8.32
B. *Introduction to Measuring Instruments* (film)					
Kinescope	61	19.21	10.91	33.86	15.50
Training Film	63	17.71	8.41	36.95	15.30

CONCLUSIONS

For the population of subjects, and the films and kinescope recordings used in this series of experiments, it made little or no difference whether a given film was represented as being a "kinescope recording" or a training film, or whether a given kinescope was represented as being a "training film" or a kinescope recording of a TV program.

This study was in no sense a comparison of the teaching effectiveness of training films and kinescope recordings as such. Since we did not have a film and a kinescope presenting the same material we could not compare the instructional effectiveness of a film and a kinescope.

The results suggest, however, that substantial learning resulted from seeing all the films and kinescope recordings used in the study, but the exact learning gains, as measured by pre-and post-tests, are not solely dependent on the films or kinescopes, but include also the effect of the pretests.[1]

A possible reason for the discrepancy between these results and those of Jackson is that the "novelty effect" of television has "worn off" since the date of his study (April 1952).

[1] Uncorrected means.

[1] See Stein, J. J. *The Effect of a Prefilm Test on Learning from an Educational Sound Motion Picture.* SDC 2697-35. The Instructional Film Research Program. Pennsylvania State University, Port Washington, L. I., N. Y.; Special Devices Center, 1952.

FACTORS LEADING TO EFFECTIVE TELEVISION INSTRUCTION[1]

• RICHARD P. RUNYON
• OTELLO L. DESIDERATO
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PREVIOUS studies have indicated that, in general, television instruction appears to have some distinct advantages over regular live instruction (1, 3, 4). Nevertheless, many individuals would not be totally satisfied with a general statement of this sort. It is probably fairly well accepted that the effectiveness of a given instructional medium is related to the way in which certain variables are manipulated in the use of that medium. The pertinent question then becomes, "Is it possible to isolate any specific variables which can be related to the differential effectiveness of the two instructional media — TV and Regular Instruction?"

In a study recently completed by the authors, the primary objective was to obtain information which could form the basis for administrative decisions concerning the utilization of television in military training during emergency and routine periods (1, HumRRO Report). However, the study was so designed that some hypotheses could be teased out concerning the effects of manipulat-

[1] The substance of this paper was presented at an APA Symposium on Military Television in September 1954.

ing a number of the presentational variables. In addition, some information was obtained on the effect of quality of visual image upon teaching effectiveness. The information will be reported in the present paper.

U. S. Army Photograph

An Instructor Lectures a Class on Military Justice in Studio "B."

EFFECTS OF MANIPULATING PRESENTATIONAL VARIABLES

One of the characteristics of the HumRRO study was that, in the 14 different hours of instruction investigated,[2] the verbal content of both television and regular presentations was kept as similar as possible. What differed to varying degrees was the "picture" which the trainees saw in both situations. Inasmuch as certain hours provided a great deal of opportunity to utilize the camera in such ways as to produce variations in the *visual* content of television and regular instruction, it seemed reasonable that any differences in the measured effects might be related to these varia-

[2] A test was administered following each lesson presented by television or in the regular classroom. Seventeen different tests, 15 paper and pencil and 2 performance tests were constructed and administered during the course of the study.

tions. At least two approaches to the problem of determining the effects of manipulating presentational variables became apparent:

1. Characterize each hour according to the dominant method or methods of visual presentation used during these hours.

2. Categorize the presentational methods and place each item used in the various tests into one of the categories. By comparing the effectiveness of television and regular instruction on the items appearing within each of the categories, one might find that certain categories discriminated between the two media.

U. S. Army Photograph

Studio "B" Where HRRO Telecasts Originated, Showing Camera Controls and Monitors in Foreground.

Dominant Method of Presentation

On the first point, it will be recalled that 14 hours of training were evaluated in the HumRRO studies. These hours were selected so as to obtain as representative a sample as possible of types of materials appearing in Basic Training. On the basis of a qualitative analysis of the presentational characteristics of each of these hours, it was determined that several hours involved training in the manipulation of small pieces of equipment; several hours re-

quired simple rote learning of a paired-associate type; several involved the learning of dynamic relationships among small moving parts; and finally several involved the conveying of straightforward items of information.

The following results were obtained: (a) Two of the 3 hours calling for manipulation of small parts significantly favored television presentation. (b) The hour concerned mainly with interrelationship of small moving parts indicated significant superiority for television. (c) Two of the 3 hours involving rote memory showed television significantly superior. (d) None of the 6 hours of the lecture-information type indicated significant superiority for either television or live instruction. Since the television presentation of the manipulation and interrelationships of small parts made lavish use of close-ups and since the hours involving rote memory made frequent use of superimposures for purposes of paired-associate training, it seems reasonable to at least suggest that the effectiveness of these hours of instruction was related to the use of the television camera to provide different visual content from regular instruction.

Categorization of Presentational Methods

The analysis of the dominant mode of presentation is, for a number of reasons, rather gross in nature. For example, although it may be true that certain periods of instruction can be characterized in terms of a predominant mode of presentation, more typically there is an admixture of several presentational modes during one period of instruction. A second, more sensitive approach, you will remember, is to classify all items used in the tests in some consistent fashion to determine if the resulting categories might discriminate between television and regular instruction. Accordingly, all of the items were classified according to: (a) the type of information they were measuring and/or (b) the presentational methods employed to impart this information. Altogether the following six categories were arrived at:

Category 1. The instructor imparts simple items of information. Training aids if used are essentially static in nature, that is, they merely repeat information given verbally.

Category 2. Training aids are used in both television and regular instruction for the purpose of teaching the nomenclature of pieces of equipment.

Category 3. Training aids are used in both television and regular instruction to indicate dynamic interrelationships among parts of equipment during the course of the functioning of this equipment.

Category 4. Training aids are used as an adjunct to paired-associate learning. On television the paired associates appeared on the screen as superimposures.

Category 5. Training aids are used for recognition training.

Category 6. Training aids are used to teach individuals to manipulate small pieces of equipment.

The method of analysis was as follows: (a) the number of items falling within each category was tabulated, (b) the number significantly favoring either television or live instruction was determined, and finally, (c) by expanding the binomial (5), it was learned whether or not the number significant within each category was greater than the number which would be significant by chance. Using this method, results indicated in Table I were obtained.

TABLE 1 — COMPARATIVE EFFECTIVENESS OF TELEVISION AND REGULAR INSTRUCTION FOR SPECIFIC CONTENT CATEGORIES (BASED ON 12 TESTS[a])

Category	*Number of Items in Category*	*Number of Items Significantly Superior*	
		TV	*Regular*
1. Simple information	80	3	3
2. Nomenclature	12	2	2
3. Interrelations among parts	8	3[b]	0
4. Paired-associate learning	22	8[b]	0
5. Recognition training	30	7[b]	3
6. Manipulation of equipment	36	11b	0

[a] Includes items from all tests except Light Machine Gun, written and performance; Map Reading, performance; Phonetic Alphabet; and Military Time.

[b] Significantly greater than the number which would be significant by chance.

Reference to Table I shows that:

1. Of the 80 items in Category 1—items of information—3 significantly favored TV and 3 live. Both are well within chance expectations.
2. Of 12 items in Category 2—nomenclature—2 significantly favored TV and 2 live. Neither of these is significant.
3. Of 8 items in Category 3—small parts—3 significantly favored TV. Three out of 8 significant would be found by chance less than 1 time in 100. None of the items significantly favored live.
4. Of 22 items in Category 4—paired-associate learning—8 significantly favored TV. This number is considerably beyond the .001 level.
5. Of 30 items in Category 5—recognition training—7 significantly favored TV, 3 live. Only the former is statistically significant.
6. Of 36 items in Category 6—manipulation of small parts—11 significantly favored TV. This is significant at well beyond the .001 level. No item significantly favored live.

In summary, significant superiority for TV instruction was found in Categories 3, 4, 5, and 6—small parts, paired associates, recognition, and manipulation of small parts, respectively.

As a result of the two types of analyses reported, the following conclusions appear warranted:

1. Television instruction is particularly adaptable to training situations which require manipulation of small equipment pieces by the trainees. (1:28)
2. Television instruction is particularly adaptable to situations which require simple rote learning. (1:28)
3. Television instruction is particularly adaptable to training situations which require the understanding of relationships among small moving parts. (1:28)

4. Television instruction is as effective as regular instruction in conveying straightforward items of information. (1:29)

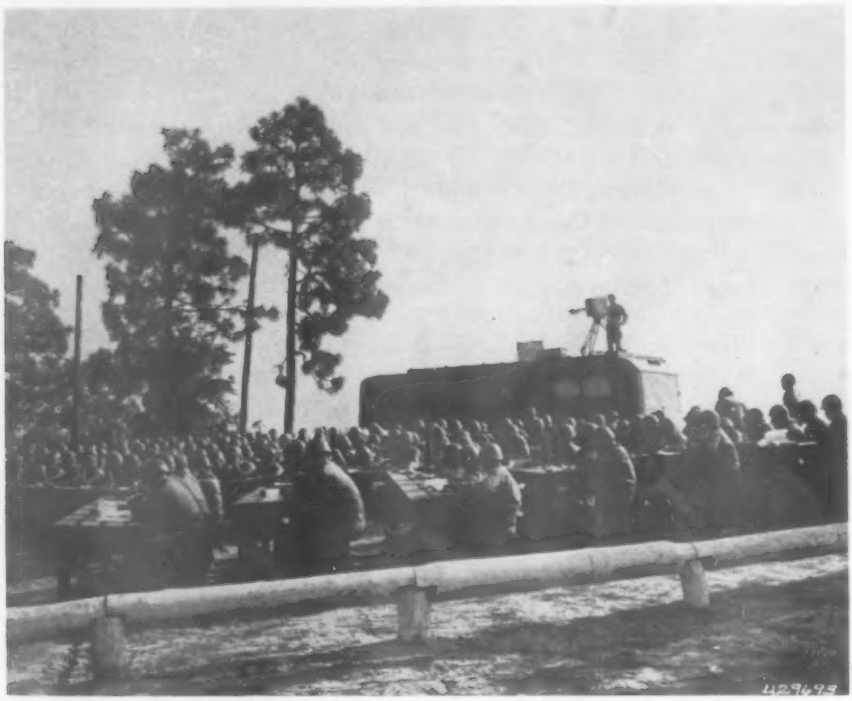
It might be noted that the types of conclusions arising out of the two approaches under discussion are quite similar. However, some objection might be raised to the two methods used to arrive at these conclusions on the grounds that they are not completely independent; that is, on a particular lesson which was judged to make frequent use of small parts the majority or the total of all the test items in the category dealing with small parts might come from that lesson. The conclusions might be felt to have greater generality if it were found that for any particular lesson which included items from several categories there was discrimination among these categories. Examination of the results again reveals fine confirmation of these conclusions. For example, in Hour 1 of Map Reading, there are seven items which measure straightforward pieces of information. None of these discriminates between television and live instruction. On the same test, however, there are six items from Category 5—Recognition Training. Of these, two significantly favor television presentation. By chance, one would expect two out of six p values to be significant less than 4 percent of the time. As another example, in Hour 2 of Map Reading, none of five items in Category 1—Information—is significant, whereas four out of eight in Category 6—Manipulation of Small Parts—significantly favor television instruction. This would be expected to occur by chance less than 1 time in 1000. In general then, the results of the item analysis lend strong support to the conclusions arising from the examination of the subject matters and provide somewhat independent evidence.

It might be appropriate at this time to mention several of the implications arising from the results just discussed:

1. Inasmuch as the effects of television were found to be related to the types of test items which were used to measure these effects, it would seem important to pay *particular* attention to the measuring instrument one uses when doing an evaluation of this sort. For example, if all of the items in all of the tests had consisted of nothing but mere items of information and did not tap any of the other categories which have been mentioned, it is likely that no differences between television and live instruction would have been obtained in this study.

2. At the outset of any research, perhaps, it might be advisable to run a factor analysis on items being used for evaluating any instructional medium to determine whether these items can

be placed within orthogonal categories. Having done this, it would seem advisable to consider including as many of these categories within a particular test as possible. In this way, one is not limited to gross scores only as a basis for arriving at conclusions. The additional possibility is open for relating the effects to the categories that have previously been determined.



U. S. Army Photograph

While Trainees Receive Live Instruction in Map Reading, It Is Also Televised to Trainees Receiving Instruction in Classrooms Via TV.

Quality of Visual Image

During the course of the study at Camp Gordon, a number of questions were raised concerning what effect the quality of the visual image has upon the teaching effectiveness of television instruction.[3] These questions were particularly pointed toward determining whether kinescopic recordings might be substituted for either television or regular instruction. These questions were particularly relevant because of the rather poor quality of the

[3] The materials in this and the following paragraphs appear in Appendix F of the HumRRO Report (1).

image in kinescopic recordings made under field conditions.

Two of the hypotheses that could be advanced concerning putative effects of poorer image quality are as follows:

1. Instruction containing materials which require a good visual appreciation of the content to be learned could be expected to be seriously affected by the poorer quality of kinescopic recordings.
2. Materials which are mainly informational in character and do not require visual appreciation of the content would not be expected to show any appreciable loss from poor-quality images.

Since all of the television hours in the HumRRO study were recorded kinescopically, there was a good opportunity to compare the teaching effectiveness of kinescopes with regular presentation. However, most of the kinescopes were not ready for use until late in the study, so it was not possible to compare their effectiveness with previous television presentations because of large differences in such factors as trainee composition or weather conditions.

It became apparent that the same methods might be used to determine the effects of quality of image as were used to partial out those presentational variables which are related to effective television presentation; that is, an item analysis could be performed to determine whether the categories mentioned earlier now distinguish between kinescope and regular instruction.

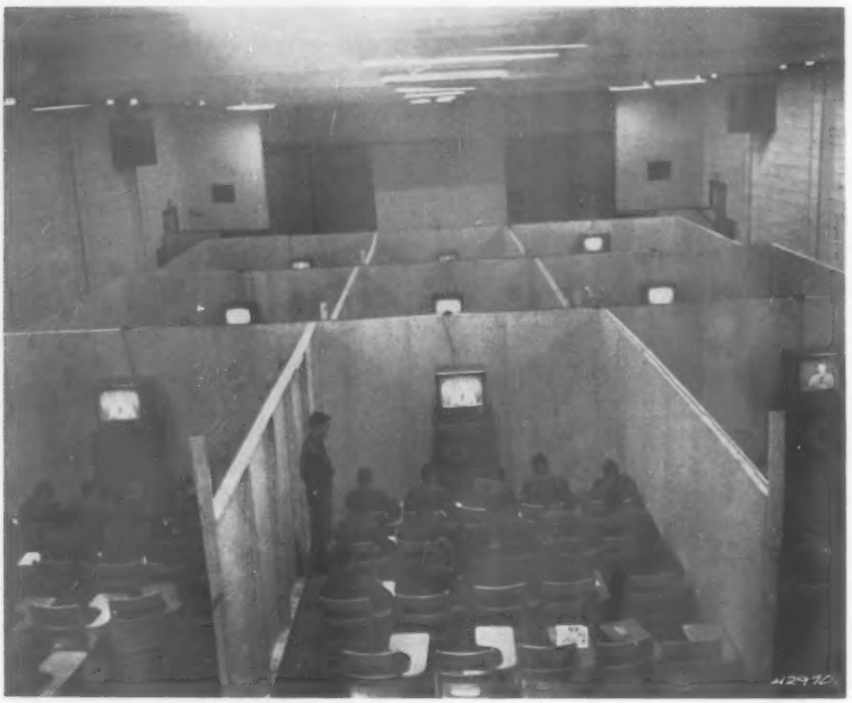
TABLE 2 — EFFECTIVENESS OF TELEVISION, REGULAR, AND KINESCOPE INSTRUCTION FOR SPECIFIC CONTENT CATEGORIES (BASED ON FIVE TESTS[a])

Category	*Number of Items in Category*	*Number of Items Significantly Superior in TV-Regular Comparisons*		*Number of Items Significantly Superior in Kinescope-Regular Comparisons*	
		TV	*Regular*	*Kinescope*	*Regular*
Simple information	21	2	1	1	3
Nomenclature	6	0	1	0	1
Interrelations among parts	5	2[b]	0	0	0
Paired-associate learning	18	7[c]	0	2	1
Recognition training	15	4[c]	2	2	3[b]
Manipulation of equipment	7	3[c]	0	0	1

[a] Includes items from M1 Functioning, Hour 4 of Map Reading, Mines and Booby Traps, Squad Tactics, and Defense Against Air and Armor.
[b] Significant beyond .05 level.
[c] Significant beyond .01 level.

Altogether, seven kinescopes were compared to regular instruction. When the items appearing in five tests for these hours were placed in the six presentational categories (Table 2), it was found that none of the categories provided evidence of statistical superi-

ority of kinescope to regular instruction. This finding contrasts with the results in the comparison of TV with regular instruction, using these identical test items, as television was significantly superior in four categories. Not only did kinescopes fail to show superiority in any of these categories, but there was actually a reversal in one of the categories—the one dealing with recognition training. The number of items significantly favoring *regular* instruction in this category was significantly greater than chance. It therefore seems reasonable to conclude that the quality of kinescopes as presently made under field conditions does have a detrimental effect upon learning. What is more, it appears that this detrimental effect is more pronounced with subject matters where visual content is important.[4]



U. S. Army Photograph

The Nine Television Classrooms as Seen from the Control Room in the Rear of the Theater.

[4] It should be pointed out that in no case were the gross mean differences in test scores between kinescope and regular presentation significantly in favor of regular instruction. In fact, in one instance, M-1 Rifle Functioning, the kinescope was significantly superior to regular presentation. It was only when comparisons were made among items within the various presentational categories that meaningful relationships began to emerge. Once again we have evidenc that sheer reliance upon gross scores can result in the concealment of valuable information.

At the outset of this paper, the question was asked, "Is it possible to isolate any specific variables which can be related differentially to the effectiveness of the two instructional media—TV and Regular Instruction?" We now have the answer. We have seen that in a program of research operating in an applied setting, it *is* possible to so plan research and statistical analyses that relationships or principles can be teased out of the data. We have also seen the great desirability of developing analytical tools which go beyond sheer reliance upon gross mean scores as a basis for drawing conclusions. In future television research,[5] it is hoped that some of our analytical tools will be sharpened and new ones invented so that some of the variables already known can be more sharply delineated and other variables, not yet known, can be added to our rapidly accumulating knowledge about television as a teaching medium.

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[5] Relatively few of the various presentational methods were explored in the HumRRO study. Future research will explore such additional presentational techniques as split screen, multi-pictures, etc. It may very well delvelop that straightforward lecture material, which in the HumRRO study produced similar learning scores in both television and regular instruction, may be enhanced in effectiveness by the utilization of certain presentational techniques. See (2), the section headed "Selection of Subject Matters for Television Training" for elaboration of this point.

CONCEPTUAL LEGACY OF AUDIO-VISUAL COMMUNICATION

• PAUL SAETTLER

This is the third in a series of articles on the history of the audio-visual communication movement. The first two papers, "Historical Overview of Audio-Visual Communication" and "History of AV Education in City School Systems," appeared in the Spring of 1954 and Spring 1955 issues. Paul Saettler is assistant professor of education, Sacramento State College, California. The study from which this paper is drawn was completed for the PhD degree at the University of Southern California.

THE CONCEPT that direct or vicarious experience is basic to real meaning and understanding reached maturation remarkably early in the minds of the world's great teachers. Although audio-visual communication was not endowed with a formal appellation, an impressive number of early educators accepted its inherent principles. This paper will trace the development of the conceptual heritage of visual-sensory teaching in educational methodology through the periods of (a) Antiquity and the Middle Ages, (b) the Renaissance, (c) the Reformation, (d) the Enlightenment, (e) the Nineteenth Century, and (f) the Twentieth Century.

ANTIQUITY AND THE MIDDLE AGES

The germinal concepts of audio-visual communication have existed since primitive man first taught his children to observe, imitate, and participate in activities vital to the survival of the tribe.

From the time that Aurignacian artists first sketched polychromatic, life-like bison on their cave walls, or sculptured animals in clay to exercise sorcery over hunted prey, audio-visual communication has been an intimate, integral component of the social, political, and religious life of man. Ages before the dawn of history,

man formed models, cut relief characters in metal, wood or stone; and inscribed picture symbols on his utensils, implements, vessels, and religious objects. Even after the development of phonetic language, such pictorial images as the Egyptian Sun-Disc, the red cross of St. George, hieroglyphic Etruscan rings, or totem masks were used to weld the illiterate masses together.

There is evidence that early civilized cultures intuitively knew the value of visual-sensory instruction. Concise, realistic sculptured memorials were designed to commemorate historical events and reflect religious ideals; dramatic art was created to influence moral and political concepts; and music was composed to re-awaken elemental instincts. Early Egyptians shaped clay-baked pictures and carved the first models; the Greeks contrived small, cord-controlled acrobatic mimes and utilized multifarious object materials in teaching history and civic ideals; and the Romans communicated stories of war victories through sculpture and bas-relief. Meanwhile, Cicero and Seneca praised the value of perceptual learning, while Quintilian and St. Jerome taught the alphabet with the aid of blocks.

During the Middle Ages, the Roman Catholic Church made the most far-reaching and epically dramatic use of audio-visual communication materials. By its extensive use of such media as frescoes, carvings, choir screens, statues, marionettes, prints, vestments, relics, and stained glass windows, the Church spoke a veritable language of sculpture and art to teach its religious lessons.

RENAISSANCE AND REFORMATION

Secularism came to dominate Renaissance culture to a greater degree than in the Middle Ages, and, simultaneously, it was unknowingly preparing for the realistic movement of the seventeenth century. Classical humanism, a transitory, but potent verbalistic phase of educational history, was ultimately challenged by educational realists who asserted their right to use their own eyes, to observe, and to study nature for themselves. While the Humanists were sweeping aside the debris of Scholasticism, such early realistic forerunners as Rabelais, Roger Bacon, Vives, Telesio, Ramus, Campanella, Andrea, Montaigne, and Mulcaster were emphasizing the importance and necessity of learning through the senses by means of actual things rather than merely learning words and rules from books.

In *Gargantua,* Rabelais had his young giant protege actually handle and use the materials he was studying when ". . . they

visited the shops of druggists, herbalists, and apothecaries and diligently considered the fruits, roots, leaves, gums, seeds, the grease, and ointments." Montaigne, clearly convinced of the value of direct experience, suggested that ". . . whatever there is singular and rare near the place where the student is, let him go and see it; a fine house, a noble fountain, an eminent man, the place where a battle has been anciently fought." In Campanella's Utopian *City of the Sun*, he would have the walls of the city and the great buildings painted with the finest pictures, maps, charts, and diagrams—to represent all the arts, sciences, and laws of mankind. Meanwhile, Vittorino da Feltre covered the walls of his school-villa with frescoes and used colored pictures to motivate his pupils; Juan Vives proclaimed that nature is the best book; Peter Ramus taught that the materials of a field of study should be drawn from experience; and Richard Mulcaster declared that ". . . the hand, the ear, the eye are the chief means of receiving and handing on our learning."

Bookish, linguistic, mathematical studies dominated the classrooms of the Reformation period. School success was measured by the ability to memorize the contents of books and rules of logic and rhetoric. This method, known as Ciceronianism, was attacked by sense realists. Francis Bacon, one of the first men to stress the inductive method of science, insisted that learning is based on sense perception and has as its aim the mastery of things in order to further man's control over nature. As a consequence, Bacon's concepts took root in the minds of such men as Milton, Hartlib, Coote, Brinsley, Dury, Hoole, and Petty. These English educational theorists put emphasis upon actual perception of things rather than the mere study of words. Also, in his writings on education, Luther expressed some ideas consonant with sense realism, but it remained for Wolfgang Ratke, Pierre Nicole, and, particularly, Johann Comenius to apply Baconian principles in the classroom.

Comenius has been, commonly and erroneously, considered the "father of visual education." Nevertheless, he has exerted a prodigious influence upon the audio-visual communication movement. His belief that nothing can be learned that has not first been presented to the senses led him, in 1658, to write the renowned *Orbus Sensualium Pictus*.[1] The influence of this picture book, probably the first illustrated book written especially for children, spread

[1] The *Orbus Sensualium Pitus* was *not* the first illustrated book as commonly believed. The first illustrated textbooks appeared about 1460, shortly after the invention of the movable metal type. Among the early illustrated textbooks were Ptolemy's *Cosmographia*, Boccaccio's *De Claris Mulieribus*, *Aesop's Fables*, Braylenbach's *Pilgrimage*, Wohlgemuth's *Schatzbehalter*, Koberger's *Nuremberg Chronicles*, and Colonna's *Dream of Paliphilius*. Also, the first printed Euclid had 420 diagrams in the margins.

to such an extent that it became a model for early illustrated primers and readers.

The great Jansenist moralist, Pierre Nicole, a contemporary of Comenius, also stressed sensory instruction in the Jansenist schools of Port-Royal. Nicole explained: "As the intelligence of children depends very much on the senses, instruction must, as far as possible, be given through the senses, and be made to enter, not the mind alone, but through the eye, there being no other sense that makes a vivid impression on the mind, and forms more clear and distinct ideas." Unfortunately, however, Port-Royal was closed by the royal decree of Louis XIV in 1661. Since this time, the influence of Port-Royal upon educational methodology has been tremendous when one considers the small size of their order and the brief time their schools operated.

THE ENLIGHTENMENT

Generally, the Enlightenment period produced germinal theories relating to educational methods, but such theories were less likely to be implemented in actual practice. The predominant methods were rationalistic in nature. One of the most noteworthy attempts to break this pattern grew out of the empirical philosophy of John Locke. He went far beyond the sense realism, earlier expressed by Comenius, when he insisted that ideas and knowledge come from the impingement of the external world upon the human mind in the form of sensations and perceptions. The implication of this philosophy is that Locke would develop the child's senses of sight, taste, smell, touch, and hearing.

The most outstanding example of the application of the empirical emphasis to classroom practice was the development of sense realism in some of the German schools of the day.[2] In both Francke's and Hecker's *Realschules*, small-scale models of ships, buildings, and machines as well as collections of plants, rocks, and small animals were used to illustrate lessons from books. Basedow went even further in his *Philanthropinum* by making extensive use of objects, models, and pictures. His *Elementarwerk*, the *Orbus Pictus* of the eighteenth century, contains one hundred copper engravings illustrating the scientific and practical subjects in drawings and charts of animals, of the human body, and of vegetation.

Undoubtedly, the most radical of all educational methodology theories emerging from the period of Enlightenment was Rousseau's

[2] Benjamin Franklin's *Proposals Relating to the Education of Youth in Pennsylvania* (1749) clearly reflected the European influences of empiricism and sense realism. Franklin proposed that his Acadmey be surrounded by gardens, meadows, and orchards for use by the students in their studies.

conception of naturalism. The philosophical leitmotiv echoing through all his works was aptly expressed when he said: "Things! Objects! I cannot ever repeat often enough that we give too much authority to words with our babbling education that produces nothing but babblers."

NINETEENTH CENTURY

Johann Pestalozzi, along with Friedrich Froebel and Johann Herbart, provided the most vigorous stimulus to the development of audio-visual communication during the nineteenth century.

While at Burgdorf and Yverdun, Pestalozzi devised a whole series of "object lessons" in order to give unrestrained action to the child's natural desire to develop his senses of sight, touch, and sound. Plants, animals, special models, tools, drawing, modeling, music, and field excursions constituted integral components of Pestalozzi's instruction. In assessing his life's work, Pestalozzi declared, "When I look back and ask myself: 'What have I specially done for the very being of education?' I find I have fixed the highest supreme principle of instruction in the recognition of sense-impression as the absolute foundation of all knowledge."

Later, the Rousseau-Pestalozzi impetus was renewed and enlarged by Froebel and Herbart. Froebel designed such activities as drawing, clay modeling, painting and coloring; and the manipulation of blocks, patterns, paper and cardboard objects, balls and cubes. Herbart systematically formulated "methods" of teaching and advocated the use of numerous objects and pictures so that knowledge could be more easily imparted.

By the latter half of the nineteenth century, the visual-sensory emphasis could be clearly discerned. Dull, unrewarding classroom procedures of earlier years were beginning to be supplanted by audio-visual communication materials and techniques. Warren Colburn published his "object-oriented" mental arithmetic; systematized field excursion techniques had been developed by Salzmann, Bender, Ritter, Stoy, Ziller, Guyot, and Parker; drawing had been introduced in the school curriculum of Boston, New York, and Philadelphia; and both the manual-training and nature study movements were beginning to emerge. At Hofwyl, Phillip von Fellenburg established a school in which his students would ". . . be duly trained to observation by calling the observing faculties into frequent exercise." In Oswego, New York, the Oswego Movement, which stressed Pestalozzian object-teaching, was begun by Edward Sheldon. Other outstanding educators, such as Horace Mann, Henry

Barnard, Charles W. Eliot, and Maria Montessori also advocated objective teaching. For example, Eliot proposed that obsolete classroom practices be reformed by using ". . . the diagram and map method of presenting to the eye groups of related facts, and the museum method of teaching social ethics from photographs, plans, and models."

Simultaneously, another facet of the visual-sensory impact upon education could be observed in the growing adult education movement—a development which ultimately set the pattern for academic respectability for audio-visual communication. Such non-school agencies of education as the lyceum circuits, the Chautauqua, the mechanics' institutes, public museums, and art institutes were beginning to utilize object materials, visual symbols, and lantern slides in their respective educational programs.

TWENTIETH CENTURY

The term, "audio-visual communication" had not arisen at the beginning of the twentieth century, but there was ample evidence that a distinctly new movement was crystallizing in American education. The technological revolution effected many changes in classroom methodology and, as a result, added immeasurably to the quickened birth of audio-visual communication. Coupled with the munificent hand of technology was the emergence of the "Dewey-oriented" modern schools, the renewed interest in object teaching, and the realization of the value of audio-visual communication materials in adult education.

Most notably, the diverse tributaries of the audio-visual communication stream were converging into a recognizable pattern. The landmarks manifested in this growth were the: (a) school museum movement; (b) organization of "visual education" departments or bureaus in university extension divisions and city school systems; (c) propaganda studies of World War I; (d) founding of local, regional, and national radio schools of the air; (e) construction of educational radio stations; (f) establishment of national audio-visual communication organizations, teacher-training courses, and professional journals; (g) development of scientific audio-visual communication research; (h) growth and development of nontheatrical films; (i) Payne Fund Studies; (j) work of Lazarsfeld at Princeton and Columbia; (k) studies of communications upon military personnel during World War II; (l) unprecedented use of audio-visual communication materials in industry and in the military during World War II; (m) allocation of educational

channels by the Federal Communications Commission for FM and television; (n) construction of educational FM and television stations; (o) establishment of university centers for the study of communication; and (p) the publication of the *Audio-Visual Communication Review*.

The current communication movement promises to extend the conceptual frontiers of audio-visual communication beyond all expectations. The major source of modern communication theory can be traced from the publication of William Sumner's *Folkways* in 1906. For the first time, Sumner introduced a type of sociological-anthropological thinking about the human symbolic processes. Later such pioneer communication theorists as Charles H. Cooley, Edward Sapir, George H. Mead, and Charles Morris built upon the Sumner structure with their varied analyses and expanded interpretations. Sapir wrote prophetically in 1931:

> . . . the multiplication of far-reaching techniques of communication has two important results. In the first place, it increases the sheer radius of communication, so that for certain purposes the whole civilized world is made the psychological equivalent of a primitive tribe. In the second place, it lessens the importance of mere geographical contiguity. Owing to the technical nature of these sophisticated communicative devices, parts of the world that are geographically remote may, in terms of behavior, be actually much closer to one another than adjoining regions, which from the historical standpoint, are supposed to share a larger body of common understandings. This means, of course, a tendency to remap the world both sociologically and psychologically.

Today, intensive research of the complete communication process is being conducted by: (a) psychotherapists, (b) industrial communications specialists, (c) physiologists and neurologists, (d) cybernetics engineers, (e) perception theory psychologists, (f) child psychologists, (g) anthropologists, (h) linguists, (i) metalinguists, (j) physicists, (k) semanticists, (l) group analysts, (m) sociologists, and (n) audio-visual communication specialists.

In the light of these developments, it is obvious that audio-visual communication specialists will of necessity find it more expedient to erect a broader conceptual framework if they are to utilize adequately the theoretical contributions of communication theorists. Perhaps, some such term as "Educational Communication" will ultimately be required to describe the communication activities, both verbal and nonverbal, which have a particular application to the classroom.

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COMMUNITY SERVICE TELEVISION PROGRAMING

• WENDELL W. WILLIAMS

Along with the periodic analyses of TV programing made by the NAEB, this study adds some significant information about the nature of local public service programing over commercial TV stations. Wendell W. Williams is executive assistant, Adult Education Program, Texas Technological College. This article is based on a doctoral study.[1]

IN LIGHT of the limited number of communities which appeared in 1953 to have prospects of noncommercial television service within the next few years, a study of local public service programming on commercial stations was initiated to examine ways in which existing facilities were being used, and to suggest ways in which they might be used more effectively in the service of their communities.

Sustaining local public service programs presented by nine stations during the first six months of 1953 were examined. All were pre-freeze VHF Stations located in Indiana or adjacent states. It was anticipated that these would be the programs most likely to deal with community concerns and to involve the participation of community organizations and agencies. Public service appearances on commercial shows were excluded in order to narrow the scope of the study; it was also noted that not all of the stations recorded this information in public service journals or other accessible records.

Data on 1775 sustaining local public service programs were gathered from station records and interviews with program directors. The analysis was limited to quantitative handling of charac-

[1] Williams, Wendell W. *An Analysis of the Local Public Service Programming of Selected Television Stations.* Bloomington Indiana: Indiana University, 1955. Cooperating television stations were: WLW-T, WKRC-TV, WCPO-TV of Cincinnati; WAVE-TV, WHAS-TV, of Louisville; WEWS of Cleveland; WFBM-TV of Indianapolis; WOOD-TV of Grand Rapids; WTTV of Bloomington.

teristics which could be enumerated; no evaluation of program quality was attempted.

CONCEPTIONS GUIDING STATION PROGRAMING PRACTICES

Definitions of local public service programing secured from program directors or other responsible officials of stations cooperating in the study were varied. Some indicated consideration of minority group interests; others reflected the belief that local public service programming should be sufficiently general to be of interest to anyone within viewing range. Most statements reflected an awareness of moral responsibility to the community; some phrased it in the more general terms of responsibility to the public.

Definitions of the stations "communities" tended to be in terms of "the community served" with varying emphases on the metropolitan area in which the station was located, and the total coverage area. Certain types of program material of interest to a localized community within the total area might be found too parochial. On the other hand, television stations may be ahead of communities in realizing that communities are expanding beyond familiar or traditional boundaries. Television may be helping create an "expanded community" which is already evolving due to good roads, fast transportation, and improved communications.

SUMMARY AND ANALYSIS OF PROGRAM DATA

Preponderance of series programing. Of the 1775 sustaining local public service programs considered in this study, 1655 (or 92 percent) were included in 76 program series, leaving only 120 one-time shows.

The pattern of series programing was common to all stations, with the percentages of programs in series ranging from 86 to 96 percent. One station presented 335 of its 349 local public service programs in series; another, 77 of its 90.

Comparatively few program series accounted for most of the series shows. Thirty-nine of the 76 series occurred several times a week (multi-weekly) or weekly for over half of the 26 weeks, and accounted for 1402 (or 85 percent) of all series shows. Of the 39 series, 9 multi-weekly series on five stations accounted for 44 percent of the 1655 series shows.

It would appear that:

1. The "flavor" and content of each of the five stations local public service programing was strongly influenced by the approximately half to two-thirds of its series programing entrusted to the institutions or agents mentioned.

2. The amount of programing done by the stations was directly related to the number of programs entrusted to such agencies. The five stations carrying these nine series were also the five carrying the greatest number of sustaining local public service shows. This suggests the extent to which stations depend on a few community resources to help the fulfil their public service responsibilities to their communities.

3. Relatively few remaining program opportunities were available to other community groups and purposes. The nature of telecourses and series featuring lectures and demonstrations by university professors usually precludes the participation of other community agencies. This, presumably, would not be as true of programs arranged by county and home demonstration agents.

4. Concentration of local public service programing in certain time segments "across the board" automatically excludes viewers not available at those particular hours, although such scheduling is convenient in that it conforms to the over-all scheduling pattern which has evolved in both radio and television.

5. The importance of the nine multi-weekly series to the total local public service programing of the five stations is only the more apparent; the same considerations apply in lesser degree to the 30 series running weekly for over half of the 26-week period. Together, the 30 series and the 9 accounted for 85 percent of all series shows.

Concentration of responsibility for determining the content and purpose of continuing series tends to limit the variety of local public service programing presented, the opportunities available to other community service groups to appear and present their interests and concerns, and viewing opportunities available to the audience at hand at other times of the day or week.

Concentration of responsibility for determining nature and content of series. Thirteen series, embracing 28 percent of the series programs, were the direct responsibility of the stations for determining nature and content of the series; the rest were entrusted to community organizations and agencies.

Educational institutions were responsible for 31 series—43 percent of the series programs.

Responsibility for determining nature and content of the remaining 32 series, with 29 percent of the series shows, was left to other kinds of agencies and groups.

Some of the program series were sufficiently general in nature and flexible in format as to permit other groups and agencies to

appear; others were so specialized as to limit or exclude such participation.

Five of the 31 series sponsored by educational institutions consistently brought in other groups, and several of the series sponsored by stations and other agencies were such that the particular interests of various community groups might be expressed or featured on an occasional program.

Other examples might be cited of series in which either the purpose of the sponsoring group, or the nature of the program, *precluded* participation of other types of organizations.

These program series were all highly specialized in terms of purpose, content, or the participation of members of a single organization or kind of institution. Such specialization practically precluded the participation of farm groups, labor groups, social work agencies, public officials or departments (other than ones whose work was featured), religious groups, cultural interest groups, civic and patriotic organizations, and fraternal orders.

This is no criticism of the stations for entrusting these and similar programs to organizations and agencies which were capable of assuming responsibility for planning series content and securing program participants. Had additional community groups been able to assume such responsibility, they too might have been given the opportunity. The fact remains, however, that only about one-fourth of the series programs and most of the 120 one-time shows, were vehicles available to community groups other than those responsible for series.

Participation on programs. Concentration of responsibility for series programs was matched by concentration of appearances by comparatively few community groups and agencies. For example, in Cincinnati during 6 months on 3 stations, 159 groups made 610 known appearances on series shows.

Seventy-four were educational institutions making 139 appearances. Of these, 50 were made by 3 institutions on 3 series which they sponsored.

Thirteen state, county and municipal government departments and agencies appeared 186 times, but of these, the police department accounted for 137 appearances.

The WLW-T farm staff produced a daily show and was credited with 122 "appearances" as a programing agency.

The above-named organizations accounted for 70 percent of the 610 known appearances on sustaining local public service pro-

grams. In addition, 7 organizations with primarily educational purposes appeared 30 times; 5 national organizations with local units appeared 12 times; 5 local private organizations appeared once each.

One-time sustaining shows on WLW-T and WKRC-TV provided opportunities for 52 appearances. Of these, 20 were made by individual citizens on one show discussing school consolidation. Fourteen of the remaining 32 appearances were made by cultural interest groups; 10 by health, safety, and welfare groups; 8 by organizations and institutions of an educational nature.

One-time sustaining public service shows of eight stations, although only 120 out of the 1775 programs examined, provided a considerable number of opportunities for appearances by community groups which might not have been able to sponsor or appear on series programs. However, analysis showed the kinds of groups making the 212 appearances on the 120 shows as following closely the distribution of community group appearances on series shows, with educational institutions and local governmental agencies again leading.

Appearances on sponsored vs. sustaining shows. In contrast to the comparatively few community groups and agencies—other than educational—which appeared on sustaining series and one-time shows, it was significant to note that 54 different groups made 70 appearances as "drop-ins" on commercial shows of WLW-T, alone. Similar information was not available from the other two Cincinnati stations.

Public service records of WHAS-TV, Louisville, also revealed that whereas 108 groups made 166 appearances on sustaining shows, 61 groups made 199 appearances on commercial programs. Of the latter, 66 were public service interviews of from 11 to 30 minutes duration on two sponsored series, and over 100 were recorded as 2-minute and 3-minute talks, interviews, or demonstrations on a third series (although some of them may have run 4 or 5 minutes). Most of these briefer appearances were made by the fire, police, health, and recreation departments, and the Louisville Safety Council.

WHAS-TV's sustaining shows tended to accommodate representatives of local government, education, and business; commercial shows, the representatives of social welfare organizations (both national and local), cultural interest, religious, and some educational groups, and agencies not appearing on sustaining shows. This would suggest the complementary nature of sustaining and commercial

programing of a public service nature, and the extent of integration of public service material in sponsored programs not covered in the present study.

Program purposes. Program directors were asked to state the purpose served by each program series or one-time show, and found it difficult to indicate a single purpose or emphasis for many of them. The following four classifications were applied by the investigator to program descriptions after all data were in, rather than as a checklist for use when interviewing program directors. Some of the shows fell in more than one category. The following figures, therefore, should be viewed as suggestive rather than definitive.

Of the 1775 local public service programs: 1381 were primarily or secondarily informational or educational in purpose; 573 were primarily or secondarily public relations and promotional in nature; 204 shows were primarily or secondarily cultural or entertainment; 190 were classified as dealing primarily or secondarily with community needs and problems.

The emphasis on information and education is not surprising in view of the fact that educational institutions, including schools, colleges, libraries, and museums, were responsible for 31 of the 76 program series and 43 percent of the 1655 series shows. Inspection of program descriptions verifies the preponderance of shows as being generally informational in nature. Many were apparently intended either directly or indirectly to publicize an organization or agency and promote it or some activity it was sponsoring. Station representatives indicated their belief that they had a responsibility to use their communications facility to promote worthy campaigns and causes.

"Community needs and problems" as a major purpose or emphasis was difficult to establish in the absence of a commonly agreed-upon definition of these terms. A larger number of shows may have dealt with such matters obliquely or subtly; certainly less than 190 shows were, strictly speaking, discussion or documentary presentations of community problems.

The question of focus. The large proportion of programs of informational and educational, or of a public relations and promotional nature, reflect either the very general or very specific purposes of the participating community groups—almost all with an "organizational focus" rather than, or more than, a "community focus."

The 1775 programs gave little evidence that either stations or communities had surveyed objectively the kind and degree of prob-

lems which existed—and then proceeded to develop programs to meet identified needs. Rather, program content seemed to be determined largely by the ability of certain organizations and institutions to assume responsibility for program series, and the interests and objectives of these particular groups.

Scheduling patterns. Scheduling patterns varied from station to station. Seventy percent of the shows were on weekdays and 30 percent on weekends, as over-all figures. Thirty-three percent of the programs of the nine stations were scheduled before noon; of these, 495 of the 583 were either telecourses on two stations or the farm show on a third. Fifty-four percent of all programs were scheduled between noon and 6 p.m.; 10 percent between 6 and 10 p.m., and only 3 percent between 10 and 11 p.m.

The present study did not attempt to determine what were the "best" hours for local public service programing. Such evaluation would need to consider the purpose of the program and the audience it was supposed to reach.

Intended audiences. Program directors were asked to indicate the location of the viewing audience for which program series and one-time programs were primarily intended. Sixty-five percent of the 1775 shows were judged to be of interest to viewers in the total coverage area; 23 percent were for metropolitan area viewers; 11 percent were for a primarily rural audience.

It was more difficult for program directors to indicate the type of audience by age and sex, for presumably many of the shows of interest to adults were also viewed by teenagers and children—and vice versa—and so were classified "general." Many of the "general" and "adult" programs were presented at hours when the available audience would have been composed largely of women. In any case, the vast majority of local public service programs were directed at adult or general audiences, with only 112 of special interest to children and 24, to teenagers.

CONCLUSIONS

Factors associated with local public service programing. Stations were ranked according to the number of sustaining local public service programs presented. These ranks were then compared with rankings of the stations according to certain station characteristics and programing patterns.

Relationship between station or programing characteristics and the amount of local public service programing was difficult to establish. The small number of stations studied precluded statis-

tical correlation techniques, and the selection of stations possessing a wide variety of station and community characteristics introduced many unknown variables.

Station characteristics. As a group, stations owned or controlled by family interests did no more local public service programing than stations owned by large corporations, nor did stations operated by resident as opposed to nonresident interests. There was no evidence that stations with more hours on the air tended to do more local live public service programing, nor was there evidence of relationship between the amount of local live programing a station did and that portion of it which was devoted to local public service.

The following characteristics, likewise, showed no apparent significant relationship to amount of programing: concentration of sets in the metropolitan area, integration of radio and television operations or of television and newspaper operations, number of months stations had operated, or their network affiliations.

It appeared that as the number of stations and size of city increased, the total number of local public service shows increased, but the average per station decreased.

Stations appeared to do somewhat more local public service programing if they had departments in addition to the program department—particularly public relations—assisting in the work. It was noted, however, that the three stations receiving program assistance and ranking 1, 3, and 4 in number of programs, also ranked in the first four stations entrusting considerable proportions of their series programing to community groups and agencies.

Undoubtedly many of these characteristics, in various combinations with each other and with other factors, served to give each station its unique "personality," but they do not necessarily appear uniformly related when rankings of stations on these characteristics are compared with rankings on amount of local public service programing.

Programing patterns. Relationships between programing patterns and the amount of local public service programing conform largely to the proportion of such programs included in series. Stations which had more programs in series also had more total shows; the more they entrusted to community groups and agencies, the more total shows they presented.

The role of community groups. Community organizations and agencies have used TV to carry out their educational functions,

interpret their work, promote their activities, and appeal for public support. Such programing has had a predominant "organizational focus" rather than a "community focus."

Program directors have been besieged by requests for program time and assistance from myriads of community groups—requests which could hardly be honored on any but a rule-of-thumb basis often influenced by public relations as much as by community welfare considerations.

Communities have consistently left it to the program directors to sort out the requests of the many groups and weave a fabric of community service. Program directors, as specialists in television production and administration, should not be expected to be specialists in community organization and omniscient as to community needs and problems. This would appear to be the legitimate function of community leaders and representatives. Stations are ultimately responsible for the programs they put on the air, but they need and would welcome responsible counsel as to what would best serve the community's needs and interests.

Communities and community groups need to be aware of the service television can render, realistic about the limitations and motivations of commercial stations, and creative in finding ways in which communities and stations can work together more effectively for their mutual advantage.

RECOMMENDATIONS

1. Stations and communities should each take initiative in exploring ways in which they can become better acquainted and cooperate more effectively, using the special skills and insights which are in the province of each.

2. Television workshops, institutes, and internship experience for community representatives, cooperatively developed, would enable community groups to understand some of the basic problems of program production and station operation, and enable them to work more effectively within the framework of station limitations and resources.

3. Stations should increase their staffs to permit more time for working with responsible community groups; it would pay off in improved programing and better public relations.

4. Community groups should explore ways in which they can achieve liaison with stations and avoid bombarding program directors with countless requests. This would seem to require some form of coordinating organization and an individual or staff—conversant

with both television production and community organization—to serve as the effective liaison agent or agency. The more inclusive the organization, the more thorough is the potential coverage of major community needs and the use of the many available community resources. The program coordinator might also function in the setting up of the proposed workshops for representatives of community groups and agencies.

5. If some cities can support noncommercial TV stations, others should be able to develop auxiliary studio facilities—possibly in cooperation with local schools or colleges—which could serve both as a training laboratory and also as a source of programs to be fed to commercial stations for transmission as public service features. Some programs would be live; others could be on film or incorporate locally-produced film inserts developed for television and community group use in cooperation with local organizations and public agencies. Such an operation would necessitate community-wide cooperation and the establishment of a board of directors to handle matters of finance, staffing, and administrative policy. A program policy board would be necessary to determine program emphases and see that the best possible use was made of the resources of the various community groups and agencies.

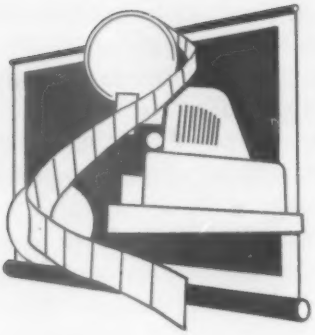
6. Educational institutions engaged in television programming should be encouraged to integrate representatives of community organizations as resource people. Institutions with television training facilities should be encouraged to extend their services to state and local organizations through regular courses, workshops, and institutes.

7. National and state agencies should explore the possibility of preparing visual materials, particularly short films and film clips, for adapted use by local organizational units. Ideally, agencies should cooperate at the state and national levels in the preparation of materials which would encourage local units to cooperate with a "community focus" at the local level.

8. To secure maximum cooperation of stations, community groups should undertake to provide quality programs, planned and executed in series.

9. Audience promotion is to the mutual interest of community and station; responsibility for audience building should begin with good programs, recurring at regular intervals, and be supplemented by promotional efforts of community groups and the station using the various means at their command.

These recommendations are all based on the premise that more effective use of existing TV facilities may be developed in cooperation with commercial stations. They necessitate recognition of the principle of "enlightened self-interest" to which stations frequently refer, and which may be expanded to embrace enlightened self-interest on part of communities, as well. It seems reasonable to expect that adoption of recommendations appropriate to each community's situation would result in the better use of existing time and the probable availability of more and better time for community service.



FILM

• ROBERT W. WAGNER

THE SPECTATOR AND THE SPECTACLE

The ideal cinema situation was once described by Mauerhofer as "one where there are absolutely no sources of light (such as emergency and exit lighting, etc.) except the screen itself, and where not even the faintest sounds, other than the sound track of the film, could penetrate."[1]

This conception is reflected in the trend of the American motion picture industry towards the "wide screen"—a technical development which has been promoted as a means for the "engulfment" of the audience, greater "spectator participation," and a heightened sense of "realism."

Lowell Thomas predicted that Cinerama would "revolutionize the technique of motion picture story telling." It had, he claimed, broken through "the space-frame generally associated with pictures," and, together with Cinerama sound, had "the dimension of reality."

Darryl Zanuck, discussing the possibilities of Cinemascope, stated:

> For some years showmen have realized that a cardinal entertainment value was the ability of the audience to identify itself with the happenings on the screen. . . . Through Cinemascope, this illusion becomes much easier. Members of the audience seem to be surrounded by the action on the screen. The figures have more substance, the voices have more timbre and direction, and clarity. The increased scope of the projection cannot fail to draw the audience into the action on the screen.[2]

[1] Mauerhofer, Hugo. "Psychology of Film Experience." *Penquin Film Review No. 8*. London: Penquin Books, 1949. p. 103-109.

[2] Zanuck, Darryl F. *New Screen Techniques*. Edited by Martin Quigley, Jr., New York: Quigley Publishing Co., 1953. p. 156.

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And the drama critic, Hollis Alpert, comparing today's stage and screen, writes: ". . . the film, with its newly expanded screen and its superior resources for staging, is not only a form of theatre, but—in almost all ways—by far the best form."[3]

Wide screen developments, together with the short-lived excitement of 3-D, resulted, of course, from the initial threat of television, in much the same way the industry had been stimulated to explore the possibilities of sound during the box-office slump of the mid-twenties.

Historically, the idea of wide screen is not new. The American Motor Corporation's "Circarama" display at Disneyland, which utilizes a battery of eleven 16mm projectors throwing images on a series of screens arranged in a 360-degree circle eight feet high and forty feet in diameter, was preceded by "Cineorama," which, in the Paris Exposition of 1900, was exhibited on a 360-degree screen producing a huge image in *color*, thirty feet high, from ten motion picture projectors! And the twenty-five by fifty-one foot Cinerama screen of today was also exceeded at the same Exposition by the Lumiere brothers, who displayed films in color on a forty-eight by sixty-nine foot screen to an audience of 25,000!

Abel Gance, described as "the Griffith of France," employed the so-called "triptych" or three-panel screen for this film, *Napoléon* in 1927, using sometimes the full width of the three screens, sometimes each screen as a separate panel, in an attempt, as Gance explained it, "to make the spectator an actor, to bring him into the action, to involve him in the rhythm of the images," to simulate the *paroxysme de la vie*.[5]

In the thirties, Fred Waller, an inventor and Hollywood special-effects man, experimented with a large, flat screen and wide angle lenses, attempting to approach the angle of vision of the human eye. During World War II, he developed a flexible aerial gunnery trainer using five synchronized projectors throwing tactical films on a curved screen to produce targets which effectively simulated aerial combat conditions.

Waller later became associated with Lowell Thomas, Merian C. Cooper, and others in the development of the most spectacular of the presentday wide screen processes, "Cinerama," which was premiered on September 30, 1952, in New York City.

Using a fifty-one foot curved screen to accomodate images from three synchronized projectors, the aspect ration of Cinerama is 2.85 to 1—nearly three times the width of the standard screen— producing a viewing angle of 146-degrees in the horizontal dimension,

[3] Albert, Hollis. "Movies Are Better Than The Stage." *Saturday Review*. July 23, 1955. p. 5.
[4] *Image*. Vol. III, No. 2. February 1954. p. 15.
[5] Manvell, Roger. *The Film and the Public*. Harmondsworth, Middlesex: Penquin Books, Ltd., 1955. p. 46.

and 55-degrees in the vertical. Stereophonic sound, which had been demonstrated in Carnegie Hall by Bell Laboratories in 1940, and employed in Disney's *Fantasia* some twelve years before the premiere of Cinerama, is used to enhance the directional effect of the wide screen image. In Cinerama, seven magnetic tracks, amplified to a very high level, are reproduced through "surround" speakers.

In August 1953, 20th Century-Fox released *The Robe* in CinemaScope. Unlike Cinerama, which requires three synchronized cameras and projectors, CinemaScope requires only one camera and one projector. It uses stereophonic sound, but employs only four instead of seven sound tracks and speakers. It is adaptable to most theaters, produces an image in an aspect ratio of 2.55 to 1, and is released either with stereophonic magnetic sound, or with a standard optical track.

The unusual feature of the CinemaScope system is a lens which had been demonstrated by Dr. Henri Chretien of France, some twenty-five years before. This so-called "anamorphic" lens (from the Greek, "anamorphosis"—to form anew), compresses the image in a ratio of 2 to 1, making human figures in the original camera negative look like elongated portraits by El Greco. The same lens, used on the projector, "unsqueezes" the image onto a wide, curved screen.

Adaptations of the CinemaScope system appeared in the form of "Superscope," a process developed at RKO, and "FilmoRama," a 16mm anamorphic system marketed by Bell and Howell.

"VistaVision," another wide screen process, made its appearance with Paramount's *White Christmas*, in 1954. This system requires a specially designed camera in which the negative travels laterally, to form images on an area 1.485-inches wide by 0.991-inches high—about the size of a double-frame filmstrip image. These negative images are then turned 90-degrees in the printing stage, and are reduced to standard position prints either in "squeezed" or conventional form, in an aspect ratio of 1.85 to 1.

"Todd-AO" developed by Broadway producer Michael Todd, in cooperation with the American Optical Company, is different from any of the previously described wide screen processes. It has an aspect ratio of 2.00 to 1, uses a single camera and one projector, and is thrown on a curved, metallic screen.

The unique factor in this system is the use of 65mm camera negative film (instead of the standard 35mm stock), and 70mm film for release printing. The wider release print stock is necessary to accommodate seven sound tracks, including one control track. Special projectors are required because of the nonstandard film size employed, and since the rate of projection is 140-feet per minute,

in contrast to the standard projection speed of 90-feet per minute. The camera, of course, is also specialized, using very wide angle lenses, and operating at a speed of 30-frames per second, instead of the standard speed of 24-frames per second. The first feature film produced by the Todd-AO system was *Oklahoma,* released in 1955.

Since it is impossible for theaters to accommodate all of the wide screen systems presently available, attempts have been made to solve the problem of compatibility. In some cases, such as the so-called "Panoramic" wide screen, for example, standard prints are simply projected through wide-angle lenses and masked-down aperture plates.

Through "Vistascope," Columbia Studios proposed to develop a "4-way camera" which would produce both 2-D and 3-D pictures in either standard or a wide screen (1.66 to 1) ratio which, in combination with special printing processes and wide angle projection systems, would be adaptable to the requirements of most theaters. Through "Perspecta Sound," either conventional or stereophonic tracks may be played without the use of multiple channels, by means of a single 100-mil optical track and a sub-audible low frequency control track and several speakers. Finally, the Phillips Electric Company, of Holland, has been working on a universal type projector capable of accommodating both 35mm and 70mm film.

What does all this add up to? How do these wide screen spectacles relate to the spectator?

First, wide screen, in one form or another, is probably here to stay. Despite the fact that we now have several kinds of wide screen, there is no real reason to adhere to the 1.33 to 1 aspect ratio established by Edison in 1888. Historically, the so-called "golden section," a proportion of approximately 1.66 to 1, has been found, in numerous paired experiments, to be the most pleasing and aesthetically satisfying form of the rectangle.[6]

Second, there is undoubted attention value in the amplification of an image. Isolating size as a factor, Adams found attention value to be approximately proportional to the square root of the size of an area. Thus, by increasing the size of a visual display by four times, its attention value is approximately doubled.[7] The amplification of the picture, coupled with the use of a magnetic, stereophonic sound system in wide screen motion pictures may effectively increase the strength of the signal, a factor of some importance in successful communication.

Third, claims of greater "audience participation," and "emotional involvement," such as those made by Thomas, Zanuck, and others, based upon the increased viewing angle of wide screen

[6] Burtt, Harold E. *Psychology of Advertising.* New York: Houghton Mifflin, 1938. p. 295.
[7] Adams, H. F. *Advertising and Its Mental Laws* New York: Macmillan, 1921. p. 107.

processes, have some subjective basis. People actually got airsick during the plane ride sequence in Cinerama, for example. But research indicates that at least a half-dozen factors enter into audience involvement, including identification with the people, places, events, and situations shown in the film; familiarity with the subject matter; anticipation; participation; subjective camera angle; and cartoon and dramatic structure.[8]

The extent to which factors other than screen size and stereophonic sound influence the apparent success of certain wide screen productions has been little discussed. Doubling the width of the screen may only make the poor story twice as bad. Capable producers, of course, realize this. Zanuck, for example, has stated that "CinemaScope is not a substitute for a story nor for good actors. But it does give us more octaves in which to tell our story and give our actors greater range for their talents."[9]

Fourth, the wide screen with its stereophonic sound is supposed to add "realism" to the presentation by making it possible for the eye to see peripherally, and by reproducing the directional qualities of sound.

While these techniques may produce a greater *illusion* of reality, is a 20-foot close-up of an actor's face more "real" than a 10-foot close-up. Is the sound of a human voice more "real" when amplified through a stereophonic sound system? Are we actually dealing with greater realism—or with a heightened sense of symbolism? The Disneyland 360-degree screen, presumably the ultimate in wide screen processes, appeared to the writer as he observed it, to be highly disorienting, although to a pigeon, with its 342-degree field of vision, or to the 360-degree view of the rabbit, the spectacle would probably seem fairly normal. At any rate, this attempt to reproduce reality in the literal sense may make the spectacle patently artificial, and perhaps actually disturbing to the normal seeing habits of the audience.

The motion picture is, after all, a performance—a highly complex symbol system. Its power is not in the fact that it reproduces reality, but rather that it intensifies, abridges, and reorganizes the real world, focussing the attention of an audience on significant details, moving the spectator through an arranged, selective sequence of visual cues in a highly *un*realistic way.

Recent studies suggest, for example, that the great amount of "realistic" detail in settings, furniture, background, costumes, and other elements of *decor* presently used to fill the added width of the screen, may actually escape the attention of the audience.[10]

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[8] Hoban, Charles F., Jr., and van Ormer, Edward B. *Instructional Film Research, 1918-1950.* Pennsylvania State University, 1951. p. 8-6.

[9] Zanuck. *op. cit.*, p. 156.

[10] Hoban and van Ormer, *op. cit.*, p. 8-17; 8-18.

Similarly, "reality" in the form of too much sound, too much color, and too much to see, may constitute "noise" which may interfere with the performance or destroy the communique. As Hoban and van Ormer put it:

> When pictures are conceived as a meduim of communication, rather than an *exact representation* of a social situation . . . discussions may then be based on audience experience and the ability to draw inferences and meanings from cues to experience, rather than on techniques intrinsic to still or motion pictures.[11]

Only as we begin to explore the effect of the wide screen with respect to its contribution to the process of communication, rather than as a technique for spectacle, can we really assess the advantages and disadvantages of the new aspect ratios and stereophonic sound. Presently, the medium is being used for the presentation of the conventional. It will be interesting to see what a Norman McLaren will do with an expanded canvass and directional sound.

It will be interesting, too, to see to what extent wide screen will alter theater design. Might tomorrow's motion picture house be a cone of seats with the screen at the base, instead of the apex? Shall we perhaps have a triptych-type screen, adaptable to the compositional requirements of individual scenes and sequences? Will there be improved 3-D, wide screen, color systems with true binaural sound adjustable to the individual hearing requirements of each spectator?

And what will the wide screen contribute to education? The value of this technique has already been demonstrated in the training of aerial gunners. College football coaches have currently begun to use 16mm wide screen motion pictures in the belief that they give greater scope to the players understanding of the game. The technique should be of interest to the psychologist and the student of perception. Sherman, for example, has used wide screen lantern slide techniques to extend the peripheral acuity of beginners in drawing classes, concluding that such acuity for the artist, "means a significantly expanded visual world."[12]

One of the advantages of face-to-face communication is the minimization of the physical barriers separating audience and performer, spectator and spectacle. The effort to remove such barriers is reflected in the early plays staged by Okhlopkov; in the arena drama, which puts the performer literally in the midst of the audience; and in the audience participation show on radio and television.

It is also a tendency found elsewhere—in the modern museum, with its moveable, manipulative exhibits, and in the classroom where formalism is giving way to situations where the physical

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[11] *Ibid.*, p. 8-8.

[12] Sherman, Hoyt L. *Drawing By Seeing.* New York: Hinds, Hayden, and Eldredge. 1947. p. 45.

setting and the whole learning situation places teacher and student inside the same "frame," reducing the distance between teaching and learning.

To what extent will the changing physical conditions in today's cinema situation actually break down the frame between the spectator and spectacle? The psychological factors which enter into this situation, and the part they play in the audience reaction remain to be tested and retested. The problem is to separate fact from fiction, to learn to use these techniques in terms of their best theatrical possibilities, to develop their less spectacular but equally important application in research and education, and to assess their total meaning in terms of the process of communication.

Unless these things are done, wide screen may remain a spectacle "full of sound and fury, signifying nothing."

BOOK REVIEW

ARNHEIM, RUDOLF. *Art and Visual Perception, A Psychology of the Creative Eye.* Berkeley and Los Angeles: University of California Press, 1954. 408 p.

Reviewed by

• **MEIDEL APPLEGATE**

As evidenced in frequent statements appearing in the literature of the field, the increasing awareness by audio-visual educators of the implications of fundamental aspects and principles of perceptual experience commonly reserved for the visual arts has prompted this reviewer to report on a recent significant and insightful book which contributes to a greater understanding of the perceptual processes. While it is not "audio-visual" in the direct sense of the term, it nevertheless contains material that could be worth the careful study of serious workers in the field. Such study would be less for the art values concerned than for the implications which a knowledge of the creative-mental process could have for anyone concerned with phenomena of structuring of discrete elements and symbols for purposes of conveying meanings and affective tone. Those who have kept away from the arts because of a distrust of the subjective and evocative characteristics should find Dr. Arnheim's book an excellent initial experience for comprehending the bases of the spectator's art rapport approached about as objectively as can be done without draining the study of its essential affective qualities. In this much-needed book, the author brings together the results of good thinking in areas, heretofore, comparatively removed from one another. In so doing, he opens vistas for further development and thought.

Serious students of the film are familiar with the contributions to thinking in the art made by Dr. Arnheim, in particular his early book *Film.* Psychologist, educator, student of the arts and of the

film, he has succeeded in consummating a happy marriage of science and art while maintaining the integrity of each. Although his remarks are directed primarily to the experiencing and comprehending of works of visual art, it does not require too much effort on the part of a reader to extend them to other areas of structured perceptual experience such as the audio-visual.

Art and Visual Perception is written in a highly readable style but it is not a book to be assimilated in an evening. The author has something to say and he says it exceedingly well, avoiding the esoteric verbal meanderings so frequently a part of the descriptive literature of art. He stresses the visual but does not neglect to relate the intellectual. Many illustrative examples serve to vitalize the text.

The book treats of the fundamental aspects of Balance, Shape, Form, Growth, Space, Light, Color, Movement, Tension, and Expression. This is done in a concise and refreshing manner devoid, as he says, "of the dazzling obscurity of arty talk, juggling with catchwords and dehydrated aesthetic concepts, the pseudo-scientific windowdressing, the impertinent hunting for clinical symptoms, the elaborate measurement of trifles, and the charming epigrams." He continues: "Art is the most concrete thing in the world, and there is no justification for confusing the minds of people who want to know more about it." He states as the purpose of the book "to discuss some of the virtues of vision and thereby to help refresh and direct them." This he proceeds to do through discussion and illustration of the psychological laws of visual-mental organization of perceived phenomena deriving from pioneer work of the Gestalt school of psychology. The visual emphasis is upon the significance and function of perceived structuring. Form is treated in terms of meaningfulness rather than in the sense of formalism. Highly creative seeing and understanding are shown to have their roots in our earliest perceptual experiences. It is indicated how training can inhibit their growth by being overbalanced toward development of the intellect and a plea is made for re-awakening man's latent powers of vision.

He deplores the lack of depth in experience as we seek for greater breadth. "Our eyes are being reduced to instruments by which to measure and identify—hence the dearth of ideas that can be expressed in images and incapacity to discover meaning in what we see. . . . The delicate balance between all our powers . . . is upset, not only when intellect interferes with intuition, but also when feeling dislodges reasoning."

"In science, greatest knowledge is achieved when all existing phenomena are reduced to a common law. This is true for art also. The mature work of art succeeds in subjecting everything to a

dominant law of structure." Toward explaining the nature of this law of structure, in the light of present knowledge, Dr. Arnheim devotes the major portion of the book.

The important thing for audio-visual educators is that there are basic elements, related to principles of art formation, perception, and comprehension, which also function structurally and perceptually in the production and utilization of much audio-visual material. Dr. Arnheim's book should help the scholar as well as the lay person to better comprehend and appreciate these values and their educational implications and thereby better bridge the gap which presently exists in an important area of audio-visual communication, its understanding, and its techniques.

RESEARCH ABSTRACTS

TELEVISION

HEADQUARTERS, SOUTHWESTERN SIGNAL CORPS TRAINING CENTER AND CAMP SAN LUIS OBISPO, CALIFORNIA. "Instructor-Student Contact In Teaching by Television." *Training Evaluation and Research Programs, Part IV, Training Research Programs. 12 pages. July 1, 1953.*

Purpose: To investigate three methods for providing two-way communication between instructor and students during television instruction. In a previous study (SPECDEVCEN Report 530-01-1) it was reported that "This situation suggests that in mass training by television, inter-communication is not needed if a studio panel is utilized during the telecast and all trainees can ask questions during the application periods later." In this research three methods were studied in order to provide for student participation which was thought to be traditionally important in both civilian and military training.

Procedure: The three methods of providing for intercommunications between students and instructor were (1) Studio class—no intercommunication system, (2) Studio class—with intercommunication system, (3) Television instructor—no studio class. In the first method the instructor communicated only with the class of students with whom he was televised. The second method differed from the first only in that communication with students in remote classes was provided using the EE-8A telephone type handset. In the third method no studio class was used and the remote classes communicated with the instructor by means of a light portable walkie-talkie, AN/PRC-10. Four classes of students of approximately fifteen students each were given one hour's instruction in the preparation of the Joint Message Form. The students were given a performance type test and were asked to fill out an evaluation form. Officers acted as observers to report on the student's behavior.

Results: When no communication existed between remote classes and the television instructor it was concluded from an analysis of comments by officer observers and students that "students in outlying classrooms, as compared to the studio audience, reacted unfavorably to the instructional situation. The instructor gave primary attention to the studio class rather than to the television camera with the result that the television audience had the impression that they were not a part of the show." When the remote classes communicated with their instructor by means of the telephone handset the individual students

were kept alert by the television instructor's practice of questioning individual students throughout the lesson. Absence of a class of students in the classroom in the walkie-talkie study apparently did not work to the disadvantage of the viewing audience and gave them the feeling that he was talking to them personally. It was concluded from this evaluation that the studio-class is desirable from the standpoint of the instructor who is placed in a conventional teaching situation; however, the remote classes do not receive the instructor's attention. Simple yet effective intercommunication systems can be devised which help keep students alert when individually questioned and help students feel that they are part of the presentation rather than merely onlookers.—*L. Twyford.*

KANNER, JOSEPH H.; RUNYON, RICHARD P.; and DESIDERATO, OTELLO. "Television in Army Training: Evaluation of Television in Army Basic Training." *Technical Report No. 14, Human Resources Research Office, The George Washington University, Washington 7, D. C. 61 pages. November 1954.*

Purpose: To obtain a measure of the relative teaching effectiveness of television instruction as compared to regular instruction, utilizing Army basic training subject matter as it is presently given.

Procedure: Information was obtained by making comparisons: (1) between television and regular instruction for 14 selected hours of basic training instruction; (2) between kinescope recordings of the live television instruction and the regular instruction; (3) between the television and regular instruction to discover the relative retention from each; (4) between low-and high-aptitude trainees on the immediate learning and retention effects of television and regular instruction; and (5) between retention without further training and with kinescope review, for low- and high-aptitude trainees. Information was obtained bearing upon the effectiveness and feasibility of the medium, qualifications of instructors for television instruction, problems and procedures in adopting present training to television and its general acceptance. The procedure included the selection of 14 hours of instruction; preparation of television instruction; giving training by television and by regular instruction with the same instructors; and administration of achievement tests immediately and after one month. The experimental data was analyzed for high- and low-aptitude trainees.

Results: Experimental comparisons indicated that: (1) television instruction was at least as effective as regular instruction; (2) television instruction was remembered at least as well as regular instruction; and (3) television instruction was more effective for lower-aptitude groups. The comparisons between showings of kinescope recordings of instruction and regular instruction indicated that they were equally effective. When the kinescopes were used for review in conjunction with regular training it was found that learning was greater than that which resulted from regular training alone. The kinescope review technique caused low-aptitude trainees to score more nearly like high-aptitude groups who had had regular instruction. The appendices give information on: (1) "novelty" or motivational effects; (2) trainee-reaction questionnaire; (3) program production techniques; (4) use of participation procedures; and (5) an analysis of the effectiveness of instructional components. The results "suggest that, should conditions require the Army to adopt a mass medium of instruction such as television, instruction of the types used in this study could be presented by television with the strong assurance that there would be no loss in learning effectiveness."—*L. Twyford.*

HEADQUARTERS, SOUTHWESTERN SIGNAL CORPS TRAINING CENTER AND CAMP SAN LUIS OBISPO, CALIFORNIA. "Program 4, Television-Type Proficiency Testing." *Training Evaluation and Research Programs, Part I Proficiency Measurement Programs. 19 pages. July 1, 1953.*

Purpose: Television-type tests are tests which are administered over television facilities. The purpose of this development program was to study the relative advantages and disadvantages of television-type tests over other tests, to develop tests which can be administered over television and to draw conclusions relating to testing by television in military establishments.

Procedure: Procedures were developed for giving matching tests, completion tests, true-false tests and multiple-choice tests over television.

Results: Various matching tests were administered adequately over television; however, the use of Kodachrome slides for this type of testing was found to be more feasible than television, because equipment would not have to be taken to a television studio and color could be used in slides. Completion type tests may be administered over television but color slides were thought to be more feasible. True-false tests were readily adapted to television and answers were recorded on a training film quiz card. Multiple choice test questions were superimposed satisfactorily on closeups of the equipment. It was concluded that television-type tests serve a useful purpose in military testing when instructor time and equipment are at a premium, where large numbers of personnel must be tested quickly without using a written test, for in-course testing, where motion picture qualification tests are not available, and to appraise "know how" rather than performance. Motion picture qualification tests were considered to be superior to television tests because quality of production was higher, savings in time and television facilities may be effected and tests may be administered in areas away from television circuits. Television-type tests of either true-false or multiple choice type can be prepared by instructors, and provide an independent check on trainee qualifications before motion picture tests are available.—*L. Twyford.*

FILM

INSTRUCTIONAL FILM RESEARCH PROGRAM. "Instructional Film Research Reports" NAVEXOS P-1220. *Technical Report 269-7-36 Research by the Instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I. N. Y. (Copies may be purchased from the Department of Commerce, Office of Technical Services, Washington, D. C. 760 pages. $6. January 1953).*

Purpose: To bring together thirty-four research reports as a single volume and integrate the results in a summary.

Procedure: The essential research result from each research study was summarized in a sentence. These results were classified according to their use by the curriculum planner, film planner and producer, instructor and the student.

Results: The following is a summary of research results: (Numbers in parentheses refer to the applicable 269-7 series report).

FOR THE CURRICULUM PLANNER

1. *Effectiveness.* Films are at least as effective as other comparable means of instruction (-13, -25). Films alone can be used to teach factual information (-13, -19).
2. *Motor-Skills.* Motor-skills that are at least as complex as operating a sound motion picture projector or performing gymnastic skills can be taught by means of films alone (-26, -29). An instructor can increase his effectiveness by using film loops to teach a skill to groups while he devotes his time to coaching individuals (-25).
3. *Mental Hygiene.* In addition to being effective for teaching skills and factual information, suitable films can be used to improve personal adjustment (-22).
4. *Specific Films.* Specific content in films is required to meet specific instructional objectives. Films with broad superficial content aimed at a generalized audience are likely to be less effective than films with well-specified content aimed at an audience of known characteristics (-19, -31).
5. *Specific Audience.* Films should be prepared for a specific audience (-31).
6. *Purposeful Use.* Use films to teach. Films are likely to be more effective if they are integrated into the curriculum, and if they are related to carefully formulated instructional objectives (-31).
7. *Consistent Use.* People learn to learn from films (-20). When films are used as fill-in, for entertainment, or if the content does not appear to the trainee to be pertinent to the course being studied, there is likely to be less learning than would otherwise be the case (-24).

FOR THE FILM PLANNER AND PRODUCER

1. *Camera Angle.* Show a performance on the screen the way the learner would see it if he were doing the job himself (-5).
2. *Rate of Development.* The rate of development of a film should be slow enough to permit the learners to grasp the material as it is shown (-17).
3. *Succinct Treatment.* Presenting only the bare essentials or rapid coverage of subject matter may be very ineffective (-11).
4. *Show Errors.* Learning performance skills from films will be increased if you show common errors and how to avoid them (-17).
5. *Repetition.* Organize a film so that important sequences or concepts are repeated in a variety of ways (-17). Repetition of films, or parts within a film, is one of the most effective means for increasing learning to a required level (-12).
6. *Organizational Outline.* Films which treat discrete factual material appear to be improved by the use of an organizational outline in titles and commentary (-33).
7. *Introductions.* Present relevant information in the introduction and tell the viewer what he is expected to learn from the film (-8).
8. *Summary.* Summarize the important points in the film in a clear concise manner. Summaries probably do not significantly improve learning unless they are complete enough to serve as a repetition and review (-8).
9. *Visual Potentialities.* Take advantage of the ability of the motion picture medium to show motion, to speed up and slow down motion, to telescope and otherwise control timing of events and processes, to bridge space, and to organize events and actions (-19, -31). The visuals and commentary in a film should reinforce each other (-18).

10. *Picture-Commentary Relationship.* The commentary of a typical informational film appears to teach more than only the pictures of that same film when learning is measured by verbal tests (-18). This does not necessarily mean that the commentary has greater inherent effectiveness than pictures; it may mean that procedures are currently relying more heavily on commentary than on pictures or on the optimum integration of the two. With films designed to teach performance skills, where learning is measured by nonverbal tests, the pictures appear to carry the main teaching burden (-4).
11. *Concentration of Ideas.* Ideas or concepts should be presented at a rate appropriate to the ability of the audience to comprehend them (-7).
12. *Commentary.* The number of words (per minute of film) in the commentary has a definite effect on learning. Care should be taken not to "pack" the sound track (-4, -11, -17).
13. *Use of Personal Pronouns.* Use direct forms of address (imperative or second person) in film commentaries. Avoid the passive voice (-4).
14. *Nomenclature.* Introduction of new names or technical terms in a film imposes an additional teaching burden on learners, and may impede the learning of a performance skill (-11, -17).
15. *Special Effects.* Special effects used as attention getting devices have no positive influence on learning (-9).
16. *Optical Effects.* A film in which such optical effects as fades, wipes, and dissolves have been replaced by straight cuts, teaches just as effectively as a film which uses these effects (-34).
17. *Steroscopic Films.* In the one experiment conducted, the addition of stereoscopic vision did not increase learning of a motor-skill performance (-32).
18. *Color.* Experimentation has not yet demonstrated any general over-all increased learning as a result of using color in instructional films (-28).
19. *Music.* Preliminary experimentation suggests that music does not add to the instructional effectiveness of an informational film (-19).
20. *Pretesting.* Scripts, workprints, demonstrations and final prints can be evaluated quickly using the learning profile method of film evaluation which requires a group of trainees to estimate their own learning (-23).
21. *Film Loops.* Short film loops which can be repeated continuously as many times as desired, appear to be a good way of teaching difficult skills (-25, -26, -27).
22. *Participation.* Learning will increase if the viewer practices a skill while it is presented on the screen, provided the film develops slowly enough, or provided periods of time are allowed which permit the learner to practice without missing new material shown on the screen (-17).

FOR THE INSTRUCTOR

1. *Let the Film Do the Instruction.* Good films can be used as the sole means for teaching some kinds of factual material and performance skills. Where the instructional situation makes it advisable, take advantage of this possibility (-13, -17, -26, -29).
2. *Instruct Students To Learn from Films.* Tell the viewers firmly that they are expected to learn from the film and if possible, tell them that they will be tested and do so (-24). This procedure will result in increased learning.
3. *Increase the Amount of Learning.* Learning can be increased by repetitive showings (-12, -16), pretesting (-35), post-testing with knowledge of results (-30), and introducing the film and stating the purpose and importance of the showing (-24).
4. *Use of Study Guides.* Ability to learn from films improves with practice in learning from films (-20). Trainees will learn more if printed study guides are used before and after film viewing (-13).

5. *Distractions.* Note-taking should not be encouraged during the average film showing because it interferes with attention and hence learning (-21).
6. *Use Film Loops in the Practice Area.* One showing of a film dealing with a complex skill may be insufficient (-29). Show a film in the practice area so that the student can easily refer to the film model as often as necessary. This can be accomplished by rear projection of film loops on daylight screens in the work area (-25, -26, -27).
7. *Use Mental Practice.* Men can partially learn to do a skill by watching a film and imagining that they are performing the skill and by going through the skill "mentally," even though they do not have the equipment available (-27). Films can provide a model for guided "mental" practice.
8. *Length of Film Sessions.* Film viewing sessions of informational material can extend to at least one hour without reduction in training effectiveness (-3).
9. *Evaluate Film Showings.* Do not assume that learning has occurred as a result of showing a film. Evaluate the effect of a film by giving a test (-30, -31).

FOR THE STUDENT

1. *Learn from Films Alone.* You can learn from films alone (-13), and the more films you see, the more you learn from other films (-20).
2. *Learning Is Your Job.* Films may contain many pleasant devices that might cause you to forget their serious instructional purposes. Films are being used to train you and you are expected to learn from them (-9, -23, -24).
3. *Discover the Instructional Purpose.* If it is not clear to you, ask your instructor what the purpose is of the film showing, and how the material relates to your training (-31).
4. *Nomenclature.* Ask your instructor which names of parts must be learned (-11, -21).
5. *Make Certain You Are Learning.* You will know when you are learning (-23). If you do not think you are learning call this to your instructor's attention (-25).
6. *Watch for Outlines.* Outlines or titles organize a film presentation and indicate how the various topics are related (-33). It will help you to learn if you will look for and study them carefully.
7. *Concentrate on the Sound.* The sound track often covers the important material to be learned in an informational film (-18).
8. *Mentally Practice.* Imagine that you are doing the job, or mentally imitate the operations when you are learning from a skill training film (-27).
9. *Ask for a Re-showing.* If you didn't learn the first time, ask for a repeated showing (12).
10. *Note-Taking.* You may miss something if you try to take notes during a film. Don't take notes unless you have plenty of time and will review them (-21).
11. *Ask for Test Results.* If you are tested on film content, ask to have the correct answers to the questions explained to you after the test so that you can improve your learning (-30).

INSTRUCTIONAL FILM RESEARCH REPORTS
(PENNSYLVANIA STATE UNIVERSITY)

Title	*SPECDEVCEN Technical Report No.*	*Dept. of Commerce PB No.*	*Price*
Instructional Film Production, Utilization and Research in Great Britain, Canada, Australia	269-7-1	105782	$ .75

Title	*SPECDEVCEN Technical Report No.*	*Dept. of Commerce PB No.*	*Price*
Music in Motion Pictures: Review of Literature with Implications for Instructional Films	269-7-2	105783	.50
The Relative Effectiveness of Massed Versus Spaced Film Presentation	269-7-3	105784	1.00
Commentary Variations: Level of Verbalization, Personal Reference, and Phase Relations in Instructional Films on Perceptual-Motor Tasks	269-7-4	105785	1.00
Effects of Learner Representation in Film-Mediated Perceptual Motor-Learning	269-7-5	105786	1.00
Learning Theories and Instructional Film Research	269-7-6	105787	.25
Relationship of Length and Fact Frequency to Effectiveness of Instructional Motion Pictures	269-7-7	105788	.50
Contributions of Film Introductions and Film Summaries to Learning from Instructional Films	269-7-8	105789	.75
The Effect of Attention Gaining Devices on Film-Mediated Learning	269-7-9	105790	.75
The Effects of Prestige and Identification Factors on Attitude Restructuring and Learning from Sound Films	269-7-10	105791	.50
Effects of Training of Experimental Film Variables Study II: Verbalization, "How-It-Works," Nomenclature, Audience Participation, and Succinct Treatment	269-7-11	105792	$ .50
Effect of Repetitive Film Showings on Learning	269-7-12	105793	.25
Relative Effectiveness of Instruction by: Films Exclusively, Films Plus Study Guides, and Standard Lecture Methods	269-7-13	105794	.50
The Classroom Communicator	269-7-14	105795	.50
The Film Analyzer	269-7-15	105796	.50
The Effects of Inserted Questions and Statements on Film Learning	269-7-16	105797	.50
Effects on Training of Experimental Film Variables, Study I: Verbalization, Rate of Development, Nomenclature, Errors, "How-It-Works," Repetition	269-7-17	105798	.50

Comparison of the Audio and Video Elements of Instructional Films	269-7-18	105799	.50
Instructional Film Research 1918-1950 NAVEXOS (P-977) (Chapter 9 covers the content of Special Report No. 1.)	269-7-19	111000	2.50
Practical Principles Governing the Production and Utilization of Sound Motion Pictures	Special Rpt. No. 1	105687	.50
Effect of Film-Viewing Practice on Learning from Instructional Films	269-7-20	111008	.50
The Value of Note-Taking During Film Learning	269-7-21	111064	.50
Effects of Mental Hygiene Films on Self-Regarding Attitudes (The)	269-7-22	111009	.50
Film Profiles	269-7-23	111065	.50
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Evaluation of a Procedure for Using Daylight Projection of Film Loops in Teaching Skills	269-7-25	111093	.50
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—L. Twyford.

VANDERMEER, A. W. "Training Film Evaluation: Comparison Between Two Films On Personal Hygiene: TF8-155 and TF8-1665." *Technical Report SDC 269-7-50 Research by the Instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I., N. Y. 27 pages. October 14, 1953.*

Purpose: To obtain an objective measure of whether the "singing commercial" approach involving strong personal appeals used in one film was more effective or desirable than the straightforward instructional approach used in the less costly film. The purpose of the two films was to change the personal hygiene habits, knowledge and attitudes of military trainees.

Procedure: 176 Army recruits saw one or the other of the two films. Four types of observations were applied to all groups both before and after the film presentation: (a) water consumption, (b) handwashing before eating, (c) personal inspection, and (d) foot inspection. The following observations of behavior related to personal hygiene were made after film showings: (a) use of PX coupons to buy tooth paste or soap, (b) use of shoe fitting machine, (c) test of learning of film content, (d) questionnaire A concerning the audience's opinions about the film, and (e) questionnaire B concerning their opinions on personal hygiene.

Results: (a) Neither film as normally used changed the observed basic personal hygiene behavior of the men to any significant degree. (b) The two films were about equally effective in teaching factual information that was common to both films. Each film was superior in teaching those facts on which it placed special filmic emphasis. (c) The straightforward approach was somewhat superior in terms of the proportion of men who indicated a favorable attitude toward it as an instructional device. (d) The films were equally effective in their ability to motivate men to perform observed acts that are associated with approved personal hygiene practices.

It was recommended that the "singing commercial" approach should not be used in training films because it is more expensive, requires more production time, and is no more effective than straightforward presentation of the facts to be learned.—*L. Twyford*

GREENHILL, L. P. "A Study of the Feasibility of Minimum Cost Motion Picture Films." *Technical Report SDC 269-7-48. Research by the Instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I., N. Y. 1955.*

Purpose: To see whether a kit of film production equipment could be assembled and suitable procedures developed which would enable relatively unskilled personnel to produce useful training films at minimum cost for local use at training bases. The films produced would be essentially film recordings of acceptable training demonstrations.

Procedure: A kit of equipment for recording lip-synchronous sound was selected and assembled. The list price of this equipment was $1500 and included the Auricon "Cine Voice" single system sound camera. A manual was prepared that described the filming procedures. The kit of equipment and manual of instructions were given to three unskilled seamen at a Naval base.

Arrangements were made for instructors to request the filming personnel to report at a specified time to film the instructor's demonstration. After six weeks the research group returned to interview the filming personnel and instructors to discover how successful the project had been.

Results: During the six weeks trial period, five films were produced. They were titled, *How to Make a Bed, The Hile-Damroth Presentation, L. M. Heterodyne Frequency Meter, Hydraulic and Automatic Thermo Pneumatic Control Systems for Magazine Sprinkler System Control Valves, Part 1.*, and *Introduction to Basic Electronics*. These films included an audio-visual record of a demonstration, record of an outstanding instructor, demonstration of small equipment not readily visible to a group of trainees, record of a demonstration on a heavy device, and a record of instruction. The typical film was 400 feet in length, required about four hours preparation, eight hours filming time and was available to the instructor after processing and editing in less than two weeks. Direct costs consisted of about $35 film cost and $30 for labor.

No particular administrative problems were encountered in producing the films. The films were found to be useful by the instructors who prepared them and they continue to be used. The Penn State reviewing panel rated the films as surprisingly good and quite adequate for training purposes. The equipment included in the kit was considered to be satisfactory. It was suggested that a larger film magazine, a more suitable microphone and a "zoom" type lens might be used with greater success.

It was concluded that relatively unskilled personnel can produce useful training films for local use, using the kit of equipment supplied—*L. Twyford.*

STEIN, ELISABETH MAYS. "Effect of Mental Hygiene Films on Normal and Abnormal Individuals." *Technical Report SDC 269-7-46. Research by the Instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I., N. Y. 42 p., May 6, 1955.*

Purpose: In this study it was desired to learn whether the sex of the main character in mental health films was important and how normal and hospitalized patients differ in their acceptance and learning from mental health films.

Procedure: In the first study, 479 college students participated in an experiment in which two motion pictures, *Feelings of Depression* and *Overdependency*, were shown. The Minnesota Multiphasic Personality Inventory was used to separate the psychological normals and deviates. An attitude questionnaire and information test were given after the film showing. In the second study 36 patients in a psychiatric hospital were shown the films used in the first study plus *Feelings of Hostility* and *Feelings of Rejection*. After seeing the films the patients were interviewed individually. The interviews were analyzed for the kinds of attitudes expressed.

Results: (a) Relevancy and acceptability are important in films which must promote learning about mental health problems. This is more important than the sex of the main character. (b) Women identify more with characters in mental health films and find them more relevant and acceptable. (c) Normal as well as acutely ill individuals do not find mental health films as relevant as do psychologically deviant individuals. (d) Those who identify most with a film tend to talk most about themselves and their problems as a result of seeing a mental health film.—*L. Twyford.*

NELSON, H. E. and VANDERMEER, A. W. "The Relative Effectiveness of Differing Commentaries in an Animated Film on Elementary Meteorology." *Technical Report SDC 269-7-43, Research by the Instructional Film Research Program, Pennsylvania State University for the Special Devices Center, Office of Naval Research, Port Washington, L. I., N. Y. 19 pages, June 17, 1955.*

Purpose: A previous report (SDC Report 269-7-18) indicated that a large part of the instructional effect of a training film was carried by the sound track; this being so, one might expect a significant increase in over-all learning to result from improvement of the commentary. In this research the sound track of the film titled *The Weather* was modified in an effort to improve it.

Procedure: Four versions of the film were prepared with the same visuals but with commentaries modified in accordance with the experimental design. Version 1 used the same commentary as the original film. Version 2 emphasized: (a) personalization, (b) simpler language, and (c) smoother reading commentary. Version 3 was intended to test the value of repetition, similes and analogies, and vivid descriptive words. Version 4 attempted to emphasize the visual element of the film by reducing the number of words and making direct references to the visuals. The effectiveness of these film versions was tested with multiple-choice type test and a diagram-type test. Two hundred and ninety one air ROTC students saw the films and were tested immediately after the film showing.

Results: All of the modified commentaries were consistently superior to the original commentary although these differences were not statistically significant at a high level of confidence. Based on these slight differences, it may be desirable to: (a) present new or difficult terminology in both pictorial and sound elements, (b) direct specific attention to pictorial aspects, (c) repeat series of facts in a sequence, and (d) use vivid descriptive terms and personalizing words. About 80 percent of the test items based on facts presented in the film were answered correctly by those trainees who merely heard the best commentary without seeing the pictures. Test items based on diagrams did not produce significantly higher scores than purely verbal items.—*L. Twyford.*

AUDIO VISUAL COMMUNICATION REVIEW

VOLUME 3
1955

WILLIAM H. ALLEN, Editor
University of Southern California

Published quarterly by
DEPARTMENT OF AUDIO-VISUAL INSTRUCTION
National Education Association

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